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Jim Webber, *president of Omicron, an IS executive user group, says topical meetings are the key to his group's success*

User groups strive to survive

By Thomas Hoffman

To get to a user group meeting these days, Rick Zizack would need to clone himself like Michael Keaton's character in the new film *Multiplicity*.

The information systems manager at The Millcraft Paper Co. in Cleveland works 12-hour days as he and his two-person staff struggle to support the 50 users who were added following his firm's recent acquisition of two paper companies.

Zizack, a member of Unisys Corp.'s Unite user group, is lucky if he makes it to one Unite conference per year.

User groups, *page 15*

Clash of titans

Microsoft gaining on Netscape in race for 'cyber mind share'

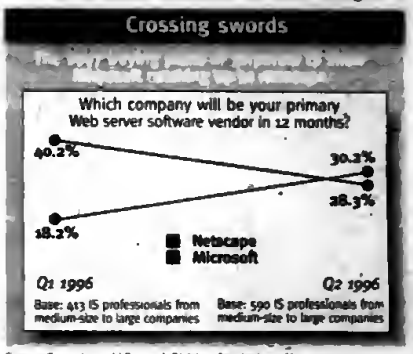
By Kim S. Nash

Microsoft Corp. appears poised to crash Netscape's Internet party.

The PC software company that just six months ago declared itself "hard-core about the Internet" is likely to catch or even overtake Netscape Communications Corp. on the server software front within the next 12 months, according to an exclusive *Computerworld* Research Division survey of nearly 700 information systems managers.

The poll was financed and conducted solely by Computerworld, Inc.'s research division, which tracks monthly buying patterns in key technology markets at medium-size to large companies. Survey results for the second quarter — from April to June

Clash of titans, *page 121*



Source: Computerworld Research Division, Framingham, Mass.

Info-boom fattens paper glut

By April Jacobs

Littered with more virtual and real paper than ever, the road to the paperless office has become the 1990s equivalent of the search for the Holy Grail.

In their quest to eliminate the great paper clog, users have turned to workflow, imaging and document management software to handle the stream of documents that flows from electronic mail, printers, the Internet, fax machines and mail services.

Virginia Retirement's Jane Pugh: *'Understand what your users need'*

"We now have a double-edged sword," said Priscilla Emery, senior vice president of information services at the Association for Information and Image Management International in Silver Spring, Md. "We still have lots of paper, but we have even more electronic documents. So the challenge is being able to manage the information."

A newly released AIIM study of 500 information technology professionals showed that 55% of the respondents are considering workflow technology.

Paper glut, *page 121*

Outsourcing cures mobile pains

Companies turn to third parties to rein in support costs

By Mindy Blodgett

The exploding mobile workforce is giving a giant headache to information systems managers already stretched thin by user demands.

To ease the pain, companies are taking two aspirin and calling for outsourcing help in the morning.

Mobile computing

"We're definitely considering outsourcing support," said Linwood Walker, senior network engineer at Pfizer, Inc., a pharmaceutical company in New York. Pfizer's head count of remote and mobile workers as well as telecommuters is 2,000 and growing.

"Staffing a 24-hour help desk is a tremendous cost, and supporting mobile workers calls for different skill sets — it's a dilemma," Walker said.

Sarah Szmuller, IS manager at the United Jewish Appeal in New York, said her nonprofit organization is also considering outsourcing mobile support.

"I don't want to walk around with a

Mobile, *page 16*

Newspaper

Olympian undertaking

Editor's Note

We'll go first

"Change is good. You go first," reads one of my favorite *Dilbert* cards. That tongue-in-cheek blend of truth and humor is, I suspect, why we're all so besotted with Scott Adams' nerdy comic strip creation. It's always more fun to watch the other guy go first.

With that in mind, we're making some changes to *Computerworld* that we hope you'll enjoy. Our alt.cw column, a bright and eclectic collection of technotrivia, is now on our back page with Inside Lines, our industry rumor column.

We've also kicked the table of contents off this page to the next one. In its place will be this Editor's Note, a rundown of the latest news items in brief, and Rich Tennant's The 5th Wave cartoon.

When you get right down to it, cultivating a sense of humor has to be a key item in today's IS survival kit. For instance, what a riot to realize that years of vendor babbling about the paperless office was all a scam. If anything, there's more paper, both real and electronic, to manage these days (see stories, pages 1 and 69), and a $3 billion industry has happily created itself just to help out.

Yet change on the IS front also leads to tension-packed late nights and long working weekends. In this week's Managing section (page 81), you can check out the coping skills of some IS folks who break out trivia games, write silly songs or bring in massage therapists when crunch time hits.

Speaking of crunch time, it's arrived with a vengeance for Netscape and Microsoft, as our lead story details. Microsoft is ready to grab big gains in the commercial Web server software market, much to Netscape's dismay. Our research into the 1997 server software buying plans of hundreds of IS professionals predicts a dead heat between the two within a year.

Once the thrashing and moaning about this survey dies down at Netscape, the company may realize this is good information to have. It's a clear heads-up that IS "mind share" is drifting to the rival camp. The power to change that is in their hands.

That's it. Everybody back to work! You go first.

Maryfran Johnson, executive editor
Internet: maryfran_johnson@cw.com

The 5th Wave by Rich Tennant

"Would you like Web or non-Web?"

AST thins down PC offering

By Justin Hibbard

AST Research, Inc. on Aug. 16 will roll out CentraLAN, a multiuser, thin-client system for customers with thin wallets, *Computerworld* has learned.

The clients comprise VGA monitors, keyboards and mice that connect through junction boxes to a 166-MHz Pentium-based host PC.

The PC runs a multiuser version of DOS as a kernel and four copies of Microsoft Corp.'s Windows for Workgroups 3.11. A board with multiple VGA controllers inside the PC lets each client display its own Windows session, but the host does the computing.

Lower price, less power

The product is aimed at small businesses, small departments in large corporations, schools and users who don't need the power of a full-blown LAN.

AST hopes those customers will buy CentraLAN rather than a server and several PCs that require yearly upgrades. The company hasn't announced a price for its product, but "low cost is the objective," said Chris Norman, a product manager at AST.

"I see more use for it in our office than in our point-of-sale system," said Colleen Scott, MIS director at Discount Tire Co. in Scottsdale, Ariz., which has 304 stores throughout the country.

Scott said processing-intensive operations such as sales require the power of a Unix-based client/server system. But for a small administrative staff in one location, a 166-MHz Pentium-based PC could be enough, she said.

News Shorts

Intel cancels price cuts

Chip giant **Intel Corp.** in Santa Clara, Calif., plans to cancel most of its scheduled November price cuts for its Pentium and other microprocessors. The company has made it a practice to cut prices every quarter. It is next scheduled to do so in August. Under the new plan, Intel will skip the November cuts and retain summer prices through February. The decision could dramatically increase revenue and profit for Intel. Lack of competition and a dearth of new products from Intel may have prompted the move, analysts said.

Clarify dials up telecom market

Clarify, Inc. in San Jose, Calif., this week will announce Clear Support Comm Center, an integrated client/server customer service and problem management system for telecommunications companies. The system gives users one point of access for information about customer accounts and the communications network. It costs $80,000, plus $3,750 for each client.

Notebooks get new features

Two notebook makers last week announced upgrades in their leading lines. **NEC Technologies, Inc.** in Mountain View, Calif., added features to its Versa 4200 and Versa 2400 series. **Digital Equipment Corp.** in Maynard, Mass., added features to its HiNote VP and HiNote Ultra II models.

Health data online

Johns Hopkins University and **U.S. Healthcare, Inc.** have launched Intelihealth, a consumer health care company that will provide online multimedia health care information. The Intelihealth service will use an **Illustra Information Technologies, Inc.** database to deliver information to consumers.

HP drops disk drives

Hewlett-Packard Co. last week said order growth slowed across many product lines and most geographic regions in the first two months of its third fiscal quarter, which ends July 31. The usually high-flying firm will close its disk drive business, which is headed for a $200 million loss this year. The division is having problems with a new 8.7G-byte drive. HP also announced it would cut prices by up to 30% on its low-end D-class and midrange K-class HP 9000 Unix servers. This sets the stage for a promised September introduction of servers based on HP's 64-bit PA-8000 microprocessor.

IBM upgrades middleware line

IBM last week announced enhanced middleware products, including a $5,000 version of DataJoiner, which now links databases from Informix Software, Inc., Sybase, Inc., Oracle Corp., Microsoft Corp. and IBM's DB2. IBM also unveiled a Windows NT version of its data replication product, DataPropogator, which costs $975.

Compaq adds desktops

Compaq Computer Corp. this week will unveil its line of consumer desktop PCs. A line of corporate PCs will be released next week. The consumer line of Presarios will include advanced graphics and high-speed modems. With its new corporate PCs, Compaq will eliminate its ProLinea line and combine all the corporate desktops under the Deskpro brand. The Deskpros will include additional systems management features, with prices ranging from $1,400 to $4,000.

Corel sweetens office suite

Corel Corp. last week announced it will add a project management package to the Corel Office Professional 7 suite. The product, Corel Time Line, is based on a popular Windows project management application from **Time Line Solutions Corp.**

Another one bites the dust

SCO, Inc. in Santa Cruz, Calif., will pull the plug on **UnixWare Technology Group, Inc.** (UTG), a vendor consortium that functioned as a marketing group for the UnixWare operating system. SCO assumed the lead role in UTG when it bought UnixWare and the Unix source code from **Novell, Inc.** last year.

SHORT TAKES **CompuCom Systems** and **Unisys Corp.** have agreed to provide joint support for multivendor desktop and network systems ... **Unisys** has won a three-year, $116 million contract from **BT** to install BT's structured cabling for business customers ... **Lotus Development Corp.** will gain another public Notes network next month when Japan's **Nippon Telephone and Telegraph** kicks off its Network Application Services by Notes.

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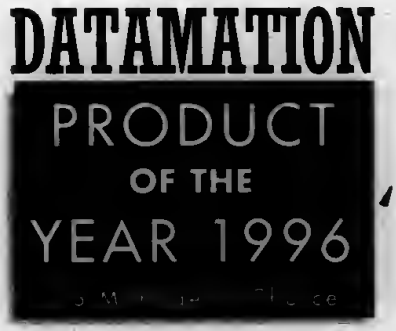

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Point/Counterpoint

Users' complaints with Version 4.1 of OpenView Network Node Manager

COMPLAINT	HEWLETT-PACKARD'S RESPONSE
We need integrated tools for managing hubs, routers and other functions to support the distributed architecture.	Half to three-fourths of our partners should be upgrading their software by year's end.
We need a cheaper and simpler Windows NT platform to spread management services throughout large networks.	Look for a functional equivalent this fall, but it may handle only smaller domains.

Tools needed for OpenView

By Patrick Dryden

Some users of OpenView, the leading network management platform, worry that migrating to the new distributed version will take too long and that it may not handle their far-flung networks.

Hewlett-Packard Co. delivered the much-delayed distributed architecture for OpenView Network Node Manager with Version 4.1 in April. This overhaul links many independent management servers, so users can shrink unwieldy central databases and reduce traffic load.

Distributed computing

But users desperately seeking distributed network management complained that they can't make the change because of the slow pace of OpenView support from third-party vendors.

Chevron Information Technology Co. is eager to distribute network management services across servers in 12 regions. But that requires other vendors to upgrade their software for managing hubs, routers and network events so that these tools will integrate with the new OpenView.

"We're praying we get our key applications ported as soon as possible. OpenView itself is maxed out now, and adding these tools brings the server to its knees," said Al Heckroth, operations automation specialist in San Ramon, Calif.

Eli Lilly & Co. in Indianapolis has only one server running Version 4.1 while it waits for other critical applications to arrive, said Tom Reinsel, telecommunications analyst at the drug company.

"We can't move our entire OpenView platform until all dependencies are covered, too," Reinsel said.

Help will begin to appear this week.

Seagate Enterprise Management Software, Inc. in Cupertino, Calif., will ship Version 2.6 of its NerveCenter event correlation software, which specifically handles a distributed OpenView configuration.

But other key applications won't arrive until the fourth quarter, according to HP officials and nagging users.

Some users questioned whether distributed OpenView can handle the management demands of very large networks.

OpenView "was not as successful as we would like" for handling a network of 15,000 connections across four campuses at Arizona State University in Tempe, said Joe Askins, director of data communications at the school. As a result, the university switched to the already-distributed Spectrum platform from Cabletron Systems, Inc. in Rochester, N.H.

A long wait

Dallas-based J. C. Penney Co. waited a year and a half to distribute OpenView. It had planned to use cheaper and simpler Windows NT servers from Microsoft Corp. instead of Unix servers. But the prototype Windows NT version doesn't appear powerful enough for four regional centers that must each handle more than 1,200 nodes, said Blaine Boswell, senior systems analyst at J. C. Penney.

HP officials claim the new platform will function exactly as the familiar Unix version does. But they have tested it by managing domains in the 500- to 750-node range only.

Frontier pushes the boundaries of WAN management: See page 63.

'Zapping' the barriers to C++

Visual development tool vendor takes on Java and Microsoft

By Frank Hayes

Facing the twin juggernauts of Java and Microsoft Corp. in its avid pursuit of corporate developers, Rogue Wave Software, Inc. this week will roll out a new release of Zapp, its C++-based cross-platform visual development system.

Zapp 3.0 runs on Windows, OS/2 and popular versions of Unix. It costs $1,995. Users who have tested the system said the new version beefs up Zapp's drag-and-drop development environment and adds a set of visual controls and C++ classes.

But Zapp's real strength lies in how the visual development environment is tied to Zapp's C++ libraries, customers said. "It saves me 20% to 30% of the coding I would have to do in any of the other application frameworks," said Craig Kendall, a senior software engineer at Mark IV Audio, Inc. in Oklahoma City.

Corporate developers often shy away from C++, citing the difficulty of writing and maintaining C++ code. Zapp helps reduce those barriers, Kendall said.

Zapp also generates applications that maintain the appropriate look and feel for each supported platform, said Ken Whitaker, vice president of development at U.S. Data Corp. in Richardson, Texas. "With some of the other cross-platform environments, you can have a Windows application that sort of looks [like Unix], and that's wrong. Users won't accept that," Whitaker said.

Good combo

The new version of Zapp adds its C++ libraries to Rogue Wave's widely used tools.h++ code libraries. The combination was designed to be easy to use and complete enough for corporate developers, according to officials at the Corvallis, Ore., company.

But Zapp faces challenges from Microsoft's Visual C++ and Sun Microsystems, Inc.'s Java Internet development language.

Visual C++'s Microsoft Foundation Classes framework is popular among software vendors, although as few as 5% of corporate developers use it, company officials said. Microsoft next week will announce a new version of C++ at its Visual C++ Developers Conference [CW, July 8]. It will be aimed at corporate use.

Other vendors are also building more corporate-friendly C++ development systems. They include Borland International, Inc. and Powersoft Corp. And Java, which has gained fame as an Internet-oriented development system, also is being touted as a language for cross-platform corporate developers.

Zapp generates C++ applications *with the appropriate look and feel for Windows, OS/2 and Unix platforms*

But in the end, Zapp's advantage is that it lets developers dodge many of the problems of C++, users said.

"You don't really need to know a whole lot," Kendall said. "If you come from the [Microsoft] Visual Basic or [Borland] Delphi world, you can use Zapp to design it and then hand it off to a C++ programmer to put the internals in. It's a great prototyping tool."

'net provider takes ATM plunge

By Mitch Wagner

Netcom On-Line Communication Services, Inc. last week said it has completed a major upgrade to Asynchronous Transfer Mode (ATM) for networking hubs in 11 cities.

The San Jose, Calif., company, one of the largest Internet service providers in the country, said the upgrade will result in faster performance and quicker recovery from network failures. Cities involved in the upgrade — which took six months to complete — include San Jose, Los Angeles, Chicago, Dallas and Washington. Before the switch, Netcom used a backbone of T1 and T3 trunks in those cities.

"I think it's smart," said Ken Hawk, CEO of 1-800-Batteries, which uses Netcom for Internet connectivity. "With ATM, you'll get faster throughput, and hopefully, it'll boost response times when people log in to our site."

The ATM upgrade will benefit all Internet users, not just Netcom customers, said Kimberly Lorencic, an analyst at The Yankee Group in Boston.

Almost all U.S. traffic on the Internet eventually travels over at least one of eight big backbone networks, including Netcom's, she said. Others are maintained by AT&T Corp., MCI Communications Corp. and specialty Internet service providers such as UUnet Technologies, Inc. and BBN Planet. MCI and BT plan to launch a multinational ATM Internet backbone in October.

Points of entry

One benefit of the ATM architecture is that it creates more connections between points on the network. That means signals have a shorter physical distance to travel, allowing the network to react more quickly. And if a point on the network goes down, there are more options for routing signals around it.

Netcom's upgrade comes as it tries to sign up more business users. It has 400,000 users, including large businesses such as the Frito-Lay unit of Pepsico, Inc., with 50,000 users, and $5 billion Wells Fargo & Co. But the majority of Netcom's business users have 15 to 1,000 employees, company officials said.

Netcom will soon offer security services and sell dial-up accounts to businesses that want to provide connectivity to mobile workers.

The company wouldn't disclose the cost of the ATM upgrade, which comes on the heels of a 13-hour network crash last month.

Benjamin Slick, vice president and general manager of the Netcom business services group, said that since the crash, the company has established procedures to prevent a similar outage from occurring, but he wouldn't give details. The ATM upgrade isn't one of those procedures, he said.

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Billing brouhaha bristles AT&T frame-relay users

By Kim Girard and Bob Wallace

Users of AT&T Corp.'s frame-relay data service are fuming about months of billing blunders.

The gripes were aired at a recent AT&T Digital Services Users Group Conference in Orlando, Fla.

The complaints differed from case to case. But the overall message to AT&T was clear: Clean up your act.

One Pennsylvania-based corporate communications analyst described his billing mess as "pretty massive."

The analyst, who requested anonymity, said his company was assessed an installation charge for each of 25 sites, even though those costs were previously waived.

He said AT&T also failed to calculate contracted discounts in the company's bill and charged for a 56K bit/sec. line that was unrelated to the company's frame-relay service.

"We just got to the point [in January] when we didn't pay anything," the analyst said. Although service was solid, bills were typically off by $1,000 to $2,000 per month, he said.

Years of problems

A Minneapolis-based information systems manager, who also requested anonymity, said he had frame-relay billing problems for three years. He said he received his first clean bill two months ago.

"I've been very vocal [about the problems]," he said. "The effectiveness of their [billing] processes has been very disappointing."

Kim Smith, an information services specialist at Goodyear Tire & Rubber Co., said AT&T needs to build better equipment to track the complexity of frame-relay use.

AT&T has included an automated billing system in its new frame-relay network, said Steve Hindman, frame-relay and Asynchronous Transfer Mode product manager at AT&T. Hindman blamed human error and the lack of systems integration for past problems.

"This reflects poorly on AT&T's frame-relay service," said Tom Jenkins, a broadband consultant at TeleChoice, Inc., a consultancy in Verona, N.J. "If bills are incorrect, the service is perceived by users as being less trustworthy."

And with fierce competition in the frame-relay service market, major billing problems could force users to consider switching to a rival provider, said another analyst, who requested anonymity. "AT&T really needs to get its frame-relay act together."

Word of the billing problems comes just one week after AT&T executives admitted that flawed software in its StrataCom, Inc. network switches had provided some of its largest users with inaccurate performance data [CW, July 8].

AT&T has also received heavy criticism from analysts for seriously underestimating user demand for frame relay.

ADSL is also bouncing back for network access. See page 61.

Carrier boosts frame net

Backbone upgrade expected to boost reliability, cut congestion

By Kim Girard and Bob Wallace

AT&T Corp. is pumping up its frame-relay network to improve reliability, reduce congestion and keep up with booming customer demand.

The overhaul — which includes a switch upgrade and migration from a T1 to a faster T3 backbone — will be done in three phases, beginning in September and ending in November.

Frame relay

AT&T lags behind competitors such as MCI Communications Corp. and LDDS WorldCom in implementing such upgrades. Sprint Communications Corp. plans similar improvements later this year.

Though not the first, AT&T's move will help solve problems that have plagued its frame-relay network, said Liza Henderson, a broadband consultant at TeleChoice, Inc. in Verona, N.J.

"There was an inability to keep up with demand, bandwidth and equipment on the switches," she said. "With higher-speed trunks and better switches, [AT&T will be able to] add more users more quickly."

Bill Osinga, technical support manager at AmeriGas Propane LP, said he hopes the moves will help prevent delay on his largest AT&T frame-relay link, between King of Prussia, Pa., and Rancho Cordova, Calif., headquarters.

Osinga said the circuit has been reliable and his service has been excellent, but he worries about glitches that can occur with any network upgrade.

Though carriers have improved methods for converting a network, "We don't want them to rest on their laurels," said Phil Evans, senior telecommunications consultant at Perot Systems Corp. in Dallas. "We want them to keep on the razor's edge" to prevent outages and problems, he said.

AT&T's existing frame-relay network

Uses T1 links connecting multiple subnetworks

Uses StrataCom IPX switches

Has a 1.544M bit/sec. backbone

Routes traffic around heavily congested sites where T1 demand is high

AT&T's new frame-relay network, to be upgraded by November

Provides a smooth migration path to ATM

Uses more powerful StrataCom BPX switches to allow the network to grow 30 times over its current capacity

Has a 45M bit/sec. backbone

Provides more predictable performance, fewer hops, shorter delay and guaranteed throughput

With T3 capability, users can send traffic in short 1.544M bit/sec. bursts and eventually higher speeds, compared with T1 speeds of 1.024M bit/sec.

AT&T will also replace StrataCom, Inc.'s IPX switches with StrataCom BPX/Axis switches that provide 30 times the power and are easier to manage.

"It's like doubling the size of the freeway. We'll have fewer traffic jams and fewer backups," Evans said. The upgrade should improve services, such as sending voice over frame relay, he said.

Growth spurt

The number of frame-relay ports in service worldwide soared from 20,935 in January 1994 to 134,829 this past January, according to Distributed Networking Associates.

Though carriers are increasingly offering higher-speed links, statistics show that many customers are satisfied with the lower speeds of 56K and 64K bit/sec. Only 16% of all frame-relay ports sold last year were T1 speed, and the figure is expected to be virtually the same this year, according to Distributed Networking Associates, Inc., a consulting and research firm.

Monitoring software for frame relay bows. See page 63.

Streaming aids multimedia 'net apps

By Stewart Deck

For today's contestants on *You Bet Your Multimedia Delivery*, the word of the day is streaming.

Whether it is Street Technologies, Inc. building and delivering training applications, Totally Hip Software, Inc.'s animation and painting program or Narrative Communications Corp. delivering CD-ROM content [CW, May 27], it all relies on streaming.

Streaming is the process of taking a piece of multimedia content and giving its events a specific order. This sequence of events is sliced up, compressed and delivered in a stream to viewers on a LAN or through the Internet. Rather than make users wait for an entire clip to download before viewing it, streaming quickly starts to deliver the first sequences of the scene.

"We're going to start seeing every kind of Internet medium being streamed because it has such a better response time and gives something to viewers right away," said Ross Rubin, an analyst at Jupiter Communications, Inc. in New York. "It helps make up for limitations in bandwidth by giving you some of the content before the whole thing is fully downloaded."

Street Technologies in White Plains, N.Y., is using streaming technology in Street Author, a product for interactive presentations and training applications.

Totally Hip Software calls its streaming technology Object Scenario. The Vancouver company licenses this streaming technology for developing and delivering interactive multimedia over several platforms. Its latest product, a cel animation/painting program called WebPainter, is built on Object Scenario.

Dolphinative Images, a digital imaging firm that creates special effects for television commercials and animation for Web pages, uses WebPainter to compile individual images and objects into animated graphics interchange formats.

Ameritech offers simplicity

Network managers who want one-stop shopping for frame-relay network service and access devices can turn to Ameritech Corp. next month.

The Chicago carrier will bundle frame-relay access device (FRAD) equipment with its frame-relay links and offer the package as a managed service.

Ameritech will sell FRADs from Irvine, Calif.-based Sync Research to users who migrate from private SNA networks to frame relay. That move typically cuts wide-area network costs by 35% to 40%.

Ameritech is among the first carriers to offer a managed end-to-end frame-relay service for users who want to run SNA over the data service.

Users can save even more as the Sync FrameNode FRADs consolidate SNA and client/server networks over one frame-relay network. Consolidation eliminates the need for two WANs with duplicate access equipment.

Ameritech will manage the Sync equipment as part of the service.

— Bob Wallace

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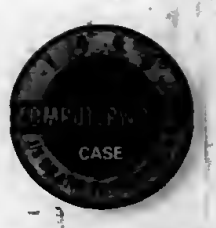

Oracle Designer/2000
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Intel moves to reduce cost of PC ownership

By Bob Francis

Intel Corp. — no stranger to cutting prices — is embarking on an initiative to reduce the total cost of owning a PC.

In the next few weeks, Intel will announce a series of seminars and new products to help corporations cut the cost of items such as software, support and administrative services.

Intel's motivation isn't entirely altruistic, said John Dunkle, president of Workgroup Strategic Services, Inc., a consulting group in Portsmouth, N.H.

"In order to demonstrate that you can use these PCs and servers like Intel says you can, they have to show IS managers that [the machines] can be managed," he said.

Intel's push to lower PC life-cycle costs is also a move to fight the perception that a network computer device attached to the Internet is cheaper and easier to manage.

At a starting price of $500 and with preloaded software, the network computer looks like a simple solution, said Paul Otellini, executive vice president at Intel.

"However, [the network computer device's] flexibility is extremely limited when compared with a PC," Otellini said.

"Intel has to fight the perception that this $500 gadget [a network computer device] will do everything a $2,000 PC will do," said James Poyner, an analyst at Oppenheimer & Co., a brokerage in New York.

A dozen grand

Gartner Group estimates that a networked PC costs a corporation about $12,000 per year for hardware, support and administrative services.

Intel officials estimate that a standard Pentium-based PC that runs Windows 3.1 costs an average of $9,324 annually.

Gartner Group, Inc. in Stamford, Conn., puts that figure at about $12,000.

Fifty-six percent of that cost covers end-user operations, which includes learning, application development, training and data management.

Technical support accounts for 15%. Another 15% comes from capital costs and the remaining 14% from administration.

More bang for the buck

Intel argues that its Pentium Pro/Windows NT systems are cheaper in the long run because those systems generally have better Desktop Management Interface (DMI) and plug-and-play support.

They also boast easy-to-use, new technologies such as Universal Serial Bus, according to Intel officials.

Those technologies give PC managers more tools to manage PC costs.

For instance, with plug and play, network cards automatically configure themselves to a user's system. This cuts down on the need for additional administrative support.

The DMI specification lets systems and network managers monitor desktop PCs, which can give the help desk fast, reliable information about a user's systems, said Cheryl Currid, president of Currid Consulting, Inc. in Houston.

For instance, if the help desk knows what software and components are on a user's PC, problems can be resolved faster and more reliably, she said.

Other PC companies, such as Compaq Computer Corp. in Houston, also plan to emphasize desktop PC management in their products.

Compaq's Intelligent Manageability asset management software will be added to the line of DeskPro systems the company will announce shortly.

Previously, Compaq had included the asset management software only in its high-end products.

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Lotus gains share

IBM unit makes strides in suites market via bundling deals

By Lisa Picarille

Although Lotus Development Corp. remains a distant No. 2 in the suite arena, the software developer is slowly gaining ground on market leader Microsoft Corp.

The momentum stems from IBM's acquisition of Lotus and Lotus' ability to leverage the popularity of Notes, plus a spate of deals to bundle Lotus' SmartSuite with PC systems and printers.

Lotus' share of the suite market jumped to 20.1% in the first quarter of this year, compared with 13% for the same period last year and 15.4% for the fourth quarter of 1995, according to a report by Dataquest in San Jose, Calif.

Lotus, in Cambridge, Mass., attributes the increase to a three-pronged push that includes a 40% increase in its advertising budget, aggressive bundling deals with PC vendors and initiatives to convert users to SmartSuite.

"Originally, we expected to reach 20% worldwide unit market share by the end of 1996, so we are three quarters ahead of schedule," said Lynn Capozzi, senior director of marketing for SmartSuite.

Err on the side of caution

Yet the author of the Dataquest report cautions against reading too much into the Lotus increase.

"Shipment shares that include a significant OEM component can be misleading if all they reflect is the shipment of software to an end user at no cost and [with] no confirmed intent to use," said Chris Le Tocq, an analyst at Dataquest. But even if the usage isn't as large as the figures indicate, "Lotus' strategy is a success."

Some observers still question how effective bundling deals are.

"The long-range impact of these bundling deals contributes nothing to the long-term market share because the conversion rate for bundled software is negligible," said Jeff Tarter, editor of "SoftLetter," a newsletter in Watertown, Mass. "I'm hard-pressed to think of any company that ever converted bundled software to a solid revenue stream."

Last week, Lotus announced that SmartSuite will be bundled with Fujitsu America, Inc.'s three new lines of laptop PCs as well as with the Proteva line of PCs sold on the Home Shopping Network.

Lotus has bundling agreements with The Acer Group, IBM PC Co., AST Research, Inc. and Epson America, Inc., whereby SmartSuite is preloaded on specific product lines.

Capozzi said she expects that by year's end, Lotus will have bundled 8.5 million units of SmartSuite 96 since the suite's introduction in November 1995.

Lotus also unveiled a SmartSuite Business Partner Campaign that includes a program for third-party Notes developers to offer consulting services, SmartSuite add-on packages and better integration with Notes.

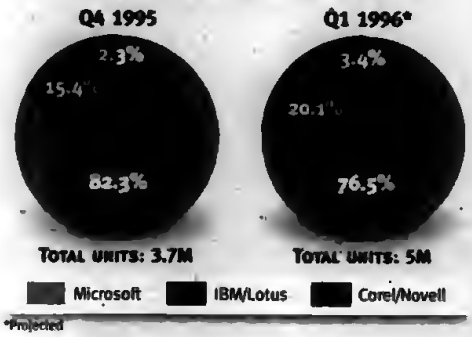
One user said better Notes integration is very appealing.

"Notes is a driving force in our organization, and better integration with SmartSuite will be a real plus for us," said Carolyn Spachner, a consulting analyst at the National Council on Compensation Insurance, Inc. in Boca Raton, Fla.

Project management moves along. See page 51.

Lotus bundles up

Factors such as Lotus' bundling deals with PC vendors during Q1 1996 have allowed the company to get more suite shipments out the door



Source: Dataquest, San Jose, Calif.

NCR, Informix guarantee delivery of NT, Unix apps

By Jaikumar Vijayan

Under a deal announced last week, NCR Corp. and Informix Software, Inc. are guaranteeing the availability of some Windows NT and Unix applications.

Similar guarantees are fairly standard in contracts for high-end proprietary systems. But this is the first time a vendor is providing this level of promise in the Unix and NT applications world, analysts said.

Here's the promise: If for any reason application availability falls below the level that had been jointly set by the customer and the vendors, the two vendors will provide — free of cost to the customer — the required software, hardware and support to bring the application back to guaranteed levels.

Product guarantees

Typically, NCR will guarantee 99.9% availability, though that number might vary in some cases, said Mike Denny, vice president of NCR's computer services group.

Initially, the guarantee extends to integrated NCR Worldmark servers running Informix's On-Line Extended Parallel Server and OnLine Dynamic Server and pretested third-party applications from PeopleSoft, Inc.

Under the arrangement, the high-availability program will initially target human resources, financial, manufacturing and distribution applications in Windows NT and Unix environments.

Some proprietary vendors, such as Stratus Computer, Inc. and Tandem Computers, Inc., offer similar performance guarantees in their service contracts with individual customers. Other vendors, including NCR, have offered similar performance guarantees on an individual basis, and most have been limited to hardware alone.

The deal "sets these vendors a notch higher than the rest" in the high-availability area, said Gene Lee, an analyst at International Data Corp. in Framingham, Mass. "It's a statement of their willingness to stand behind their products."

Users seeking to migrate mission-critical applications to client/server platforms have been demanding these kinds of performance and reliability guarantees for some time now, said Donna Scott, research director at Gartner Group, Inc. in Stamford, Conn.

Although technologies such as clustering, for instance, are bringing increasing levels of high availability to hardware, the NCR/Informix announcement is the first to extend systemwide high-availability guarantees, she said.

Highlights of the NCR/Informix alliance

High-availability transaction-processing program: The companies will integrate their hardware and software products with application software from third parties

High availability and Informix services practice: Consulting service for custom design, integration and optimization of high-availability platforms

Long-term joint development: Focus on R&D, sales and services

Informix database gets powerful boost

By Dan Richman

Informix Software, Inc. at its user conference last week announced the most powerful implementation of its relational database management system.

Version 8.1 of Extended Parallel Server (XPS) from the Menlo Park, Calif., company spreads all RDBMS functions — including loading, sorting, querying and transaction processing — across two or more linked symmetrical multiprocessing (SMP) machines. The arrangement is called clustering.

XPS also works with massively parallel processing machines. On-Line, the company's former top-end offering, only spread functions across multiple processors in a single SMP machine.

Equal responsibility

The approach taken by XPS means "less dependence on a single processing 'basket' that could break at any time," said V. Jane Garske, MIS director at Sun Country Airlines in Menota Heights, Minn. Any machine's functions can be temporarily assumed by another machine.

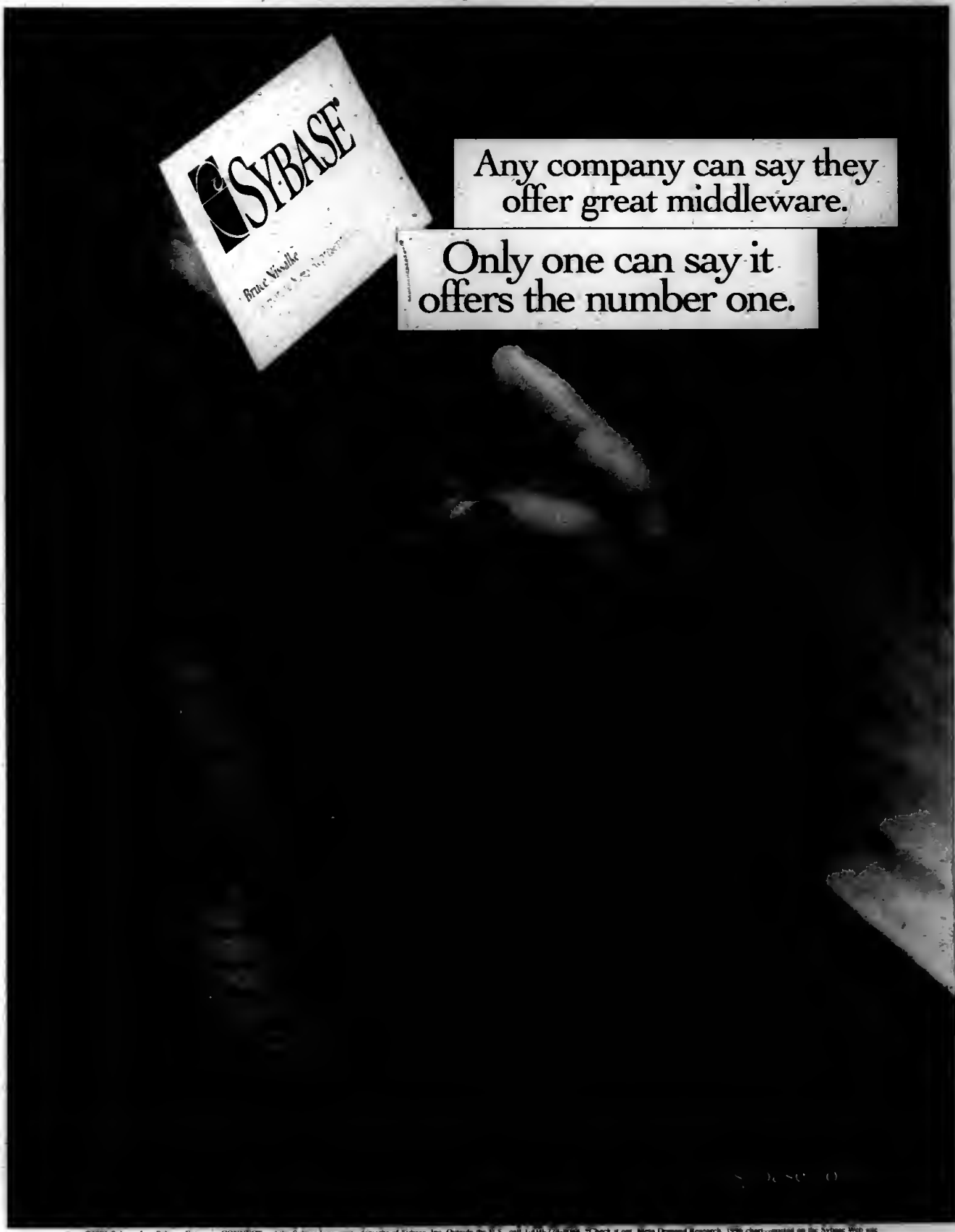
XPS also can handle large databases efficiently, said Don Upton, a database administrator at MCI Communications Corp. in Colorado Springs. At that beta site, XPS takes 70 minutes to join three tables of telephone-solicitation records, averaging about 200 million rows. The product turns out a 350 million-row result set that marketers can analyze for trends, he said.

That procedure would have taken IBM's DB2 a week and OnLine at least 10 times as long, Upton said. The increased efficiency means the database can be enhanced with additional demographic information, he said.

"XPS is a very good technology, putting Informix into a battle with Oracle for the most capable parallel technology," said Dan Kusnetsky, an analyst at International Data Corp. in Framingham, Mass.

Version 8.1 has been available for the past year only to select customers and then only on IBM's RS/6000 SP machines. It will be generally available by Aug. 1 for NCR Corp.'s WorldMark 5100, ICL Corp.'s Goldrush MegaServer and Hitachi Data Systems Corp.'s SR4300. Versions for nine additional platforms will be announced by Nov. 1. Pricing starts at $30,000.

Data replication takes off. See page 51.



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Intel chips in with Internet products

By Bob Francis

Intel Corp. doesn't want its processors left out of the World Wide Web craze.

Santa Clara, Calif.-based Intel is expected to announce a series of products, strategies and alliances to keep it the forefront of Internet technology. The chip maker will make the announcement July 24 at its Internet Media Symposium to be held in Santa Clara.

Pushing the PCs

Intel's MMX processors were designed to make multimedia a standard feature on most PCs.

Intel hopes to defuse any momentum behind the network computing device, which uses low-power processors to access Internet applications. Intel's message is that Internet applications require more processing power and local disk drives to be effective.

The vendor will emphasize the following technologies:

- Support for developing "hybrid applications," which deliver interactive content — such as a news feed — from Web pages. More complex content is delivered from information stored on the PC's hard disk drive or CD-ROM drive.
- MMX technology, which is Intel's multimedia-ready version of the Pentium and Pentium Pro chips that will arrive later this year.
- Support for video streaming over the Internet. Video streaming allows a video signal to come through a standard telephone line in to a PC application with little or no signal degradation.

Intel is betting on better compression algorithms and other technologies to speed data transfers over the Internet.

The company said standard phone lines will be the most common way for users to access the Internet, not cable modems.

Cable modems won't have a huge impact on the market until at least the end of the century, said Frank Gill, executive vice president at Intel.

Users said they will need some of these tools soon. "I expect we'll see more Internet technologies in our applications soon, and we'll need tools to do that," said Simon Taufique, a network administrator at New York University.

Analysts said Intel's goal is to retain market leadership as Internet applications become more important to users.

An old technology returns for the 'net. See page 61.

Double occupancy

Hyatt outsources information technology functions to CSC/Sabre

By Frank Hayes

Hyatt International Corp. last week said it has outsourced its information techology operations to a joint venture between Computer Sciences Corp. (CSC) and AMR Corp.'s Sabre Decision Technologies division.

The five-year, $72 million deal was signed June 30 and takes effect Aug. 1. The deal will split Hyatt's 140-member information systems staff between CSC and Sabre. No jobs will be lost in the transition, officials from both companies said.

"It's not a traditional outsourcing deal," said John Byrne, vice president for hospitality systems at Sabre. "Hyatt's interests weren't to cut costs, and they were very happy with the technology that was being delivered."

Outsourcing

Instead, the botel chain hopes to commercialize the Unix-based reservations software it has developed since 1990, said Brett Cowell, director of development at Hyatt's Regency Systems Solutions subsidiary in Oak Brook, Ill.

Personnel shift

Sabre will absorb 46 Hyatt developers and marketing staff and use them as the core for a new division to develop and sell software for hotels and other hospitality companies, said Victor Vesnaver, assistant vice president at Regency Systems Solutions.

Hyatt's operations staff will be employees of CSC, which will handle systems management for the hotel chain's reservations system.

Hyatt's reservations software gained attention in August 1990 when the company switched overnight from a mainframe-based reservations system to one based on a cluster of Unix servers.

The hotel chain tried to sell the software to other botel companies but found resistance against buying software from a direct competitor. The new arrangement should make it easier to market the software, Vesnaver said.

Apple speeds CHRP support

By Lisa Picarille

Apple Computer, Inc. later this month will release an alpha version of its Macintosh operating system that supports the Common Hardware Reference Platform (CHRP), codeveloped by Apple and PowerPC chip partner IBM, *Computerworld* has learned.

It was anticipated that Macintosh users who were contemplating a move to CHRP would have to wait until next summer, when Apple delivers Copland, its next-generation operating system.

But sources say Apple is rushing to release an alpha version of the CHRP-enabled Mac OS to hardware and software developers this month so it won't fall behind IBM and several Macintosh clone makers that are preparing to deliver PowerPC-based CHRP machines in the second half of this year.

Slow to market

Apple originally had intended that Copland — now called Mac OS 8 — would be its CHRP operating system.

But Copland has met with several delays and won't be available until next summer. Because of its recent financial troubles, declining market share and its status as a key PowerPC proponent, Apple can't afford to be left out when the first wave of CHRP computers hits the streets, observers said.

Those machines were designed to run multiple operating systems, including IBM's AIX, Mac OS, Sun Microsystems, Inc.'s Solaris, Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare.

Apple is expected in the fourth quarter to deliver the final version of the Mac OS on CHRP, according to sources. Officials at the Cupertino, Calif., computer maker declined to comment.

D&B Software gives mainframe client/server feel

By Julia King

Dun & Bradstreet Software is offering the look, feel and some of the flexibility of client/server applications to users of its mainframe software.

Last week, the Atlanta vendor announced its SmartStream CoHost application, client-based software that gives users Windows-like access to D&B Software's M and E series General Ledger applications. The cost is $10,000, plus $395 per user.

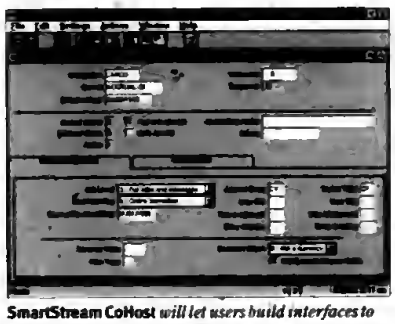
"CoHost is an out-of-the-box application that customers can install on end users' desktops, and the next time they sign on, they'll have a graphical look and feel to host applications," said Randy Pilkenton, a D&B Software product director. "There is nothing that needs to be done to the mainframe to make this work. Users get all the same security they have now."

Can be customized

Developed in Powersoft Corp.'s PowerBuilder, the CoHost application can be customized to individual users' requirements.

The application also incorporates middleware technology that lets users access and integrate data concurrently from several sources.

Using software tools that come with CoHost, users can also build CoHost interfaces to client/server applications from D&B Software and other vendors.



SmartStream CoHost *will let users build interfaces to other client/server applications from D&B Software and other vendors*

"In the CoHost environment, we can streamline screens so users read only the information they want to read," said Cleo Smith, a beta user and project leader at Truman Medical Center in Kansas City, Mo.

Previously, users had no way to customize data presentation. They were forced to download screens that contain much more information than they actually use, he said.

CoHost also works to give "user-friendly" data access to a wider base of users, according to Chris Framel, a financial systems analyst for the city of Albuquerque, N.M., another beta site.

Prior to CoHost, city government workers needed to run a decision-support report against the mainframe system or call a staffer in the accounting department to obtain an account balance.

Under CoHost, these users can look up the information themselves from their PCs, Framel said.

"I'm hoping CoHost allows us to use mainframe applications more to their potential and distribute them out to our end-user community," Framel said.

User groups face sagging membership and low attendance

CONTINUED FROM PAGE 1

"User groups are probably needed now more than ever, but the explosion of client/server computing doesn't allow anyone to get out of the office," Zizack said.

And corporate downsizing and rightsizing have certainly taken their toll on user groups, as IS shops have been forced to absorb more work, often with fewer people. That has become a big problem for many more well-established user groups and professional trade associations.

MMA's Priscilla Tate: *'By the time everybody introduced themselves, the meeting was half over'*

They have lost members, been forced to merge with other groups or, as in the case of the Microcomputer Managers Association (MMA), have had to file for bankruptcy protection [CW, May 6].

For example, Guide, one of two IBM mainframe user groups, has seen a significant drop in attendance. "It used to be that a company with five or six different divisions would send a delegate from each area," said Linda Mainord, a former president of Guide. "Now that those companies have rightsized, we're usually seeing just one representative."

The Digital Equipment Computer Users Society (DECUS) has witnessed a 40% drop in attendance at its biannual U.S. symposiums in the past decade, said Ted Grenham, executive director of the group.

But not all user groups are hurting. Omicroo, an IS executive user group in Mountain Lakes, N.J., has grown 35% in the past two years to 110 member companies.

"User groups are probably needed more now than ever, but the explosion of client/server ... doesn't allow anyone to get out of the office."

- Rick Zizack, a member of Unisys' Unite user group

The key to Omicroo's success is keeping conference sessions topical, said president Jim Webber. Upcoming Omicron meetings will focus on choosing between Windows NT and Windows 95 operating systems on corporate desktops and how to maintain successful corporate World Wide Web sites.

And DECUS hired consultancy Booz Allen & Hamilton, Inc. last year to help it assess the changing landscape. DECUS is following Booz Allen's recommendation to do extensive market research before it builds conference programs.

A variety of pitfalls, such as the following, have tripped up user groups:

- Volunteer officers with full-time jobs sometimes overcommit themselves or don't have the management skills to run a user group.
- Poor structure can lead to a user group's collapse. The MMA, for example, used to have 28 people on its board of directors. "By the time everyone introduced themselves, the meeting was half over," said Priscilla Tate, executive director of the MMA until 1993.
- User groups find themselves competing with thousands of vendor-sponsored conferences and training seminars.
- Timing is critical. New York Oracle User Group, Inc. no longer holds meetings on the heels of big Oracle Corp. conferences.
- Communication is key. The Corporate Association for Microcomputer Professionals, for one, has quintupled its mailing lists over the past five years to reach more prospects.

Senior editors Craig Stedman and Lisa Picarille contributed to this story.

IBM tweaks RS/6000

Company adds SMP features to make processor commercial-friendly

By Craig Stedman

IBM this summer will finally fulfill a promise to make its Unix parallel processor less of a bear for commercial users.

Long-overdue support to use symmetrical multiprocessing (SMP) servers as RS/6000 SP compute nodes will emerge this quarter, sources said. The multiprocessing capabilities will accompany IBM's equally overdue introduction of SMP servers based on the PowerPC 604 chip.

Jeff Liebl, an analyst at Smaby Group, Inc. in Minneapolis, said SMP support will give the RS/6000 SP a more cluster-like feel that should be easier to grasp for users outside of the scientific and technical markets. "It's not rocket science anymore," he said.

Experienced commercial users agreed that the ability to configure SMP nodes on their RS/6000 SPs should yield several important benefits. Those include reduced programming complexity, increased support for running off-the-shelf applications and easier administration.

"SMP is a very developer-friendly environment," said David Audley, director of investment systems and services at Tiger Management Corp., a New York investment firm that plans to add multiprocessors to its six-node RS/6000 SP later this year.

The wide range of off-the-shelf software for SMP platforms also is appealing, Audley said.

Developing parallel applications across multiple uniprocessors offers more scalability than SMP but also requires "a lot more work," he said. "You don't mind doing that for high-payoff stuff, but for a [more generic] application, you just don't want to spend the time."

The RS/6000 SP was supposed to get SMP support last year, but the arrival was delayed by problems in getting the PowerPC 604 to handle multiprocessing.

Other vendors, such as Hewlett-Packard Co., Digital Equipment Corp. and NCR Corp., have since announced parallel/SMP hybrids, leaving IBM to catch up.

Moody's Investors Service, Inc., a corporate debt-rating firm in New York, is also looking at bulking up its 16-node RS/6000 SP with 604-based SMP servers.

The multiprocessors would speed up database applications that run on separate nodes and use the RS/6000 SP's communications switch to exchange data, said Bob LaBue, vice president and director of technical operations at Moody's.

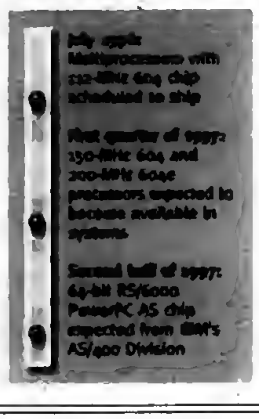
Making it easy

Moody's also hopes to consolidate multiple uniprocessor nodes into a smaller number of SMPs, reducing the size of its machine and making systems management less of a chore. "My theory is, more parts, more problems, and less parts, less problems," LaBue said. "It's as simple as that."

The announcement of 604-based SMPs and support for using them in the RS/6000 SP could come as early as next week, sources said. IBM declined to comment other than to confirm that each will become available this summer.

Time passages

IBM's planned availability of PowerPC-based RS/6000 servers



A ticket seller uses parallel processing. See page 47.

Mobile pains

CONTINUED FROM PAGE 1

beeper all the time and be on constant call," Szmuller said.

Companies are being squeezed by competing trends — the pressure to cut costs and downsize is colliding with the skyrocketing mobile workforce.

And the problem is likely to worsen. Giga Information Group in Cambridge, Mass., predicts that by 2000, 80% of portable users will use notebooks as their primary PC, up from the current 30%.

Mobile users require more support than desktop PC users. International Data Corp. in Framingham, Mass., figures that one technician is needed for every 20 to 30 remote and mobile users, about 50% more than PC users.

Lanier Worldwide's Michael Murray *says the company expects 'to save by outsourcing'*

And that translates into higher costs. Gartner Group, Inc. in San Jose, Calif., has found that the cost of ownership, including acquisition, administration and technical support for desktops, is $35,692 per user over five years vs. $48,704 for laptops.

Part of the problem is that traveling executives run into trouble not encountered by desktop workers, including the following:

- Insufficient battery life.
- Communications/networking difficulties.
- The need for proprietary software and sophisticated middleware for access.
- Wireless technologies that call for special skills and knowledge.

But rather than add mobile specialists to the IS staff or set up a seven-day-a-week, 24-hour-a-day help desk, firms are increasingly turning to the growing number of suppliers of mobile support services and third-party help desks.

The trend is so new that hard numbers aren't available. But Charles Breed, product marketing manager at remote access equipment vendor Cisco Systems, Inc. in San Jose, Calif., said companies can save up to 20% by outsourcing.

"It depends on the size and application, but you save in salaries, facilities and in head counts," Breed said. "And these days, Wall Street likes lower head counts."

Michael Murray, director of national accounts at Lanier Worldwide, Inc. in Atlanta, said his company has turned to DecisionOne Corp. for mobile support as part of a sales force automation project.

He said although the numbers aren't final, the company expects "to save by outsourcing. And it just removes a lot of headaches, too. We didn't want to build from scratch."

There's hope for the wireless. See page 45.

Internetworking firms to unveil road map to multimedia

By Bob Wallace

Top internetworking vendors this week are expected to reveal plans for products that allow the simultaneous transmission of voice, data and video traffic from desktop to desktop over Asynchronous Transfer Mode (ATM) networks.

Madge Networks, Inc. in San Jose, Calif., will provide a blueprint for its MadgeOne architecture. Lucent Technologies, Inc. in Murray Hill, N.J., will announce an alliance with Bay Networks, Inc. that will lead to multimedia networking products, industry sources said.

In theory, corporations could use the technology to deliver videoconferencing, imaging, training and distance-learning applications to the desktop — without any one type of traffic suffering performance hits.

Some of those capabilities are possible today with proprietary schemes that don't use ATM. But ATM has a "quality of service" feature to ensure that each type of traffic has enough bandwidth and optimal performance.

But the necessary upgrades to existing products won't be available for months. Users can expect to see multimedia support from Madge early next year and from Bay/Lucent later this year or early next year.

Although multimedia isn't ready for prime time in corporate America, analysts emphasized that Madge and Bay — each of which posted poor earnings recently — need a foothold in this emerging market for competitive reasons.

Users, however, are concerned with other issues.

"We have to make sure that these multimedia plans are not proprietary because we're interested in interoperability among multiple vendors' ATM products," said Bill Horst, chief at the U.S. General Services Administration's communications branch in Philadelphia. "Without guarantees of end-to-end interoperability with ATM, multimedia won't become a requirement for us."

Multimedia with MadgeOne

Madge switches slated for voice-over-ATM support in 1997

Product	Description
Collage 530	Ethernet-to-ATM access switch
Collage 540	Token Ring-to-ATM access switch
Collage 250	Workgroup ATM switch
Collage 280	Workgroup ATM switch

Madge and Bay aren't the first to address the need to provide multimedia support to the desktop. 3Com Corp. rolled out a similar, proprietary scheme called Priority Access Control Enabled in the fall of 1994 and has many switching products that support it, but it was designed for switched Ethernet links, not ATM.

Analysts said MadgeOne is an architecture that calls for upgrades to existing LAN switches so that they can support voice and video traffic in addition to data (see chart). MadgeOne uses voice-over-ATM technology developed by longtime private branch exchange vendor Mitel Corp.

Eventually, the MadgeOne blueprint will be expanded to cover wide-area networks — an extension made possible by the firm's purchase of WAN access products powerhouse Teleos Communications Corp. in January.

Sources said the Bay/Lucent alliance will enable the duo to offer virtually the same capabilities as MadgeOne.

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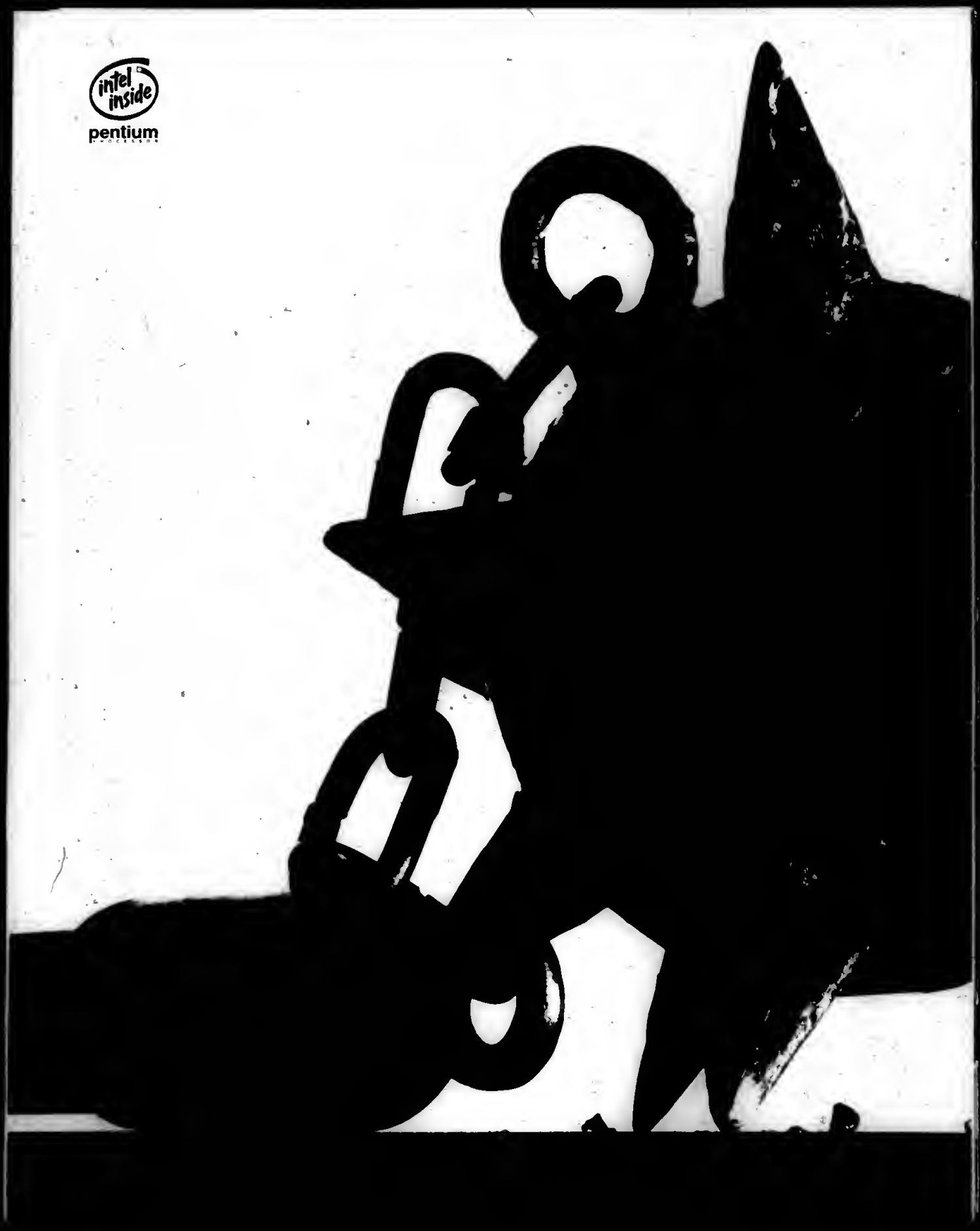
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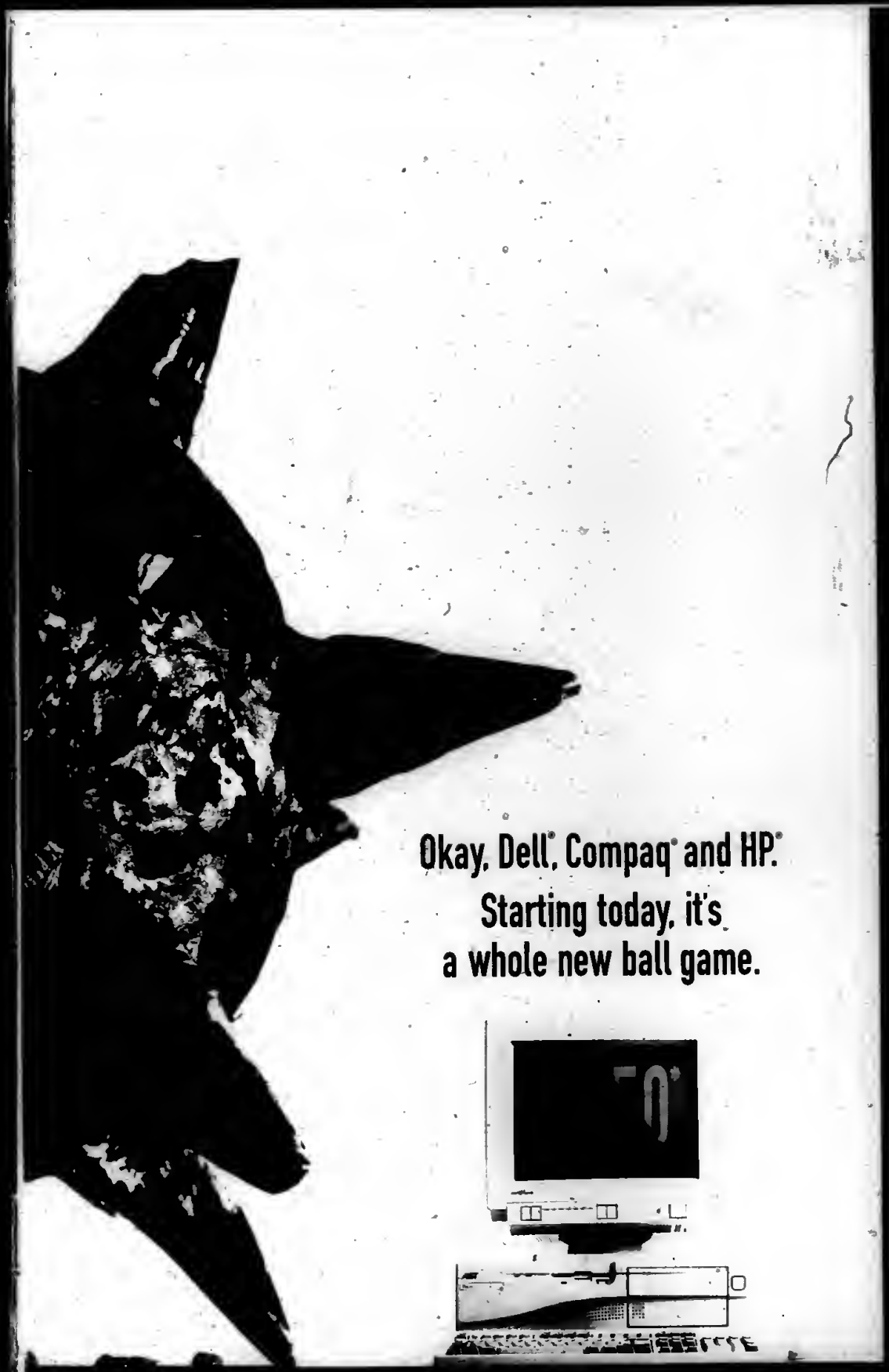
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HAPPENING

Suite analyzes 'net impact on key apps

By Patrick Dryden

Make Systems, Inc. is overhauling its network analysis and design tools so planners for the first time can gauge the Internet's effect on vital client/server business applications.

Release 2.5 of NetMaker XA can track Internet traffic to interpret its impact on more than 100 applications. It includes new profiles for browsing the World Wide Web or an intranet.

"Now, Make's users can assess the impact of the Internet on key applications like SAP R/3, Lotus Notes and Oracle databases and prepare for deployment of intranet-based applications," said John Morency, principal at The Registry, Inc., a network consultancy in Newton, Mass.

The Mountain View, Calif. company's move is timely because Internet usage is causing many corporations to be concerned about bandwidth utilization, said Jennifer Pigg, vice president of data communications at The Yankee Group, a market analysis firm in Boston.

Competitors such as Optimal Networks Corp. in Mountain View, Calif., provide similar capabilities for examining Internet activity, she said. "But no one offers a suite of tools that goes further in suggesting upgrade scenarios," she said.

Easing managers' minds

There is a "general queasiness in the marketplace" about how Web browsing affects applications, said Steve Howard, CEO of Make Systems.

"Network managers worry about the unwashed mass of Internet applications gobbling up bandwidth from their mission-critical business functions," he said.

Typically, an integrator or capacity planner will track a network's baseline performance before deploying a new database or other application. Now NetMaker XA can monitor and simulate Web browsing, along with other applications, to project their interaction and responsiveness.

Network analysis

"If performance suffers, you can analyze why and figure out how to fix by redesigning some parts or applying policies to limit Web browsing," Howard said.

Other enhancements to NetMaker XA include automated discovery of frame-relay circuits, which helps users visualize wide-area network performance, and design tools that accommodate usage patterns that shift by time of day.

And for the first time, those who manage router-based networks can experiment with survival modeling software, Howard said. A Survivability Module for the analyzer tool can project the effect of a router's failure on application response time and traffic flow.

Those upgrades improved network analysis for beta-tester Dan Tulledge, a senior performance engineer at AlliedSignal, Inc. in Morristown, N.J.

"We've used NetMaker as a traffic cop, but now we can [be] more proactive," Tulledge said. For example, operators who monitor the frame-relay WAN can easily choose a subset of traffic to analyze in order to understand bandwidth demands.

"What was a three-day effort for our whole network is now an automated, overnight task," Tulledge said.

NetMaker XA 2.5 costs between $7,000 and $95,000, depending on the number of tools and modules required.

But few organizations are prepared to get their money's worth from this sophisticated suite, analysts said. Few large support staffs include anyone classified as a network designer or performance modeler, and the typical firefighting mode precludes planning-and-design projects, Morency said. That is why Make Systems now targets large integrators and consultants and offers its own consulting services for $1,750 per day.

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Client/server apps to plug in to open standards

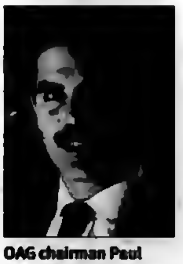
By Julia King

Users will see a bumper crop of plug-and-play enterprise applications by year's end if vendor members of the Open Applications Group (OAG) follow through on delivery commitments made last week.

SAP AG, Oracle Corp., Marcam Corp., QAD, Inc. and American Software Corp. all agreed to ship OAG-compliant versions of their client/server products before Dec. 31. Dun & Bradstreet Software will be first to market with an OAG-compliant version of its SmartStream software, which will be available later this month.

Meanwhile, several other OAG members, including PeopleSoft, Inc., J. D. Edwards & Co., Texas Instruments, Inc., Software 2000, Inc. and IBM Manufacturing Solutions Unit, have promised — in writing — to develop new products according to OAG standards.

"There was a lot of skepticism before, but now vendors are committing in writing to make their applications compliant with the OAG standard," said Paul Margolis, chairman of the 17-member vendor consortium.



OAG chairman Paul Margolis: *More vendors are complying with the consortium's standards*

With OAG-compliant applications, "All the plugs are in place. All users will have to do is get a patch cord and plug it in at both ends," he said.

G. D. Serle, a pharmaceutical company in Skokie, Ill., is among those firms betting on OAG-based mix-and-match software. The firm is implementing SAP's financial applications and Marcam's Prism manufacturing software.

"We are counting on their compliance with OAG specifications to make these products work together," said Anil Monga, senior project manager.

The OAG was formed in 1994. Its mission is to furnish users with multivendor, best-of-breed, client/server applications, all of which can be integrated out of the box without additional software interfaces. This is done by passing data among applications in a form that all can understand.

Dominant share

OAG vendor members represent almost $4 billion of software industry revenue and close to 80% of the market for enterprise applications, according to Advanced Manufacturing Research, Inc. in Boston.

The OAG last week published its second set of specifications, which covers how manufacturing applications, such as inventory and production control, interoperate with financial applications. The group's first specification, released last December, covers interoperability among general ledger and inventory applications.

The OAG specifications are available for free at the group's World Wide Web site: www.oag.org.

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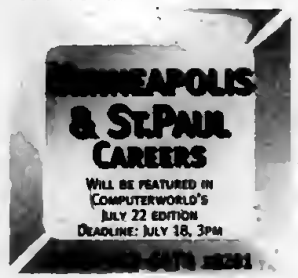

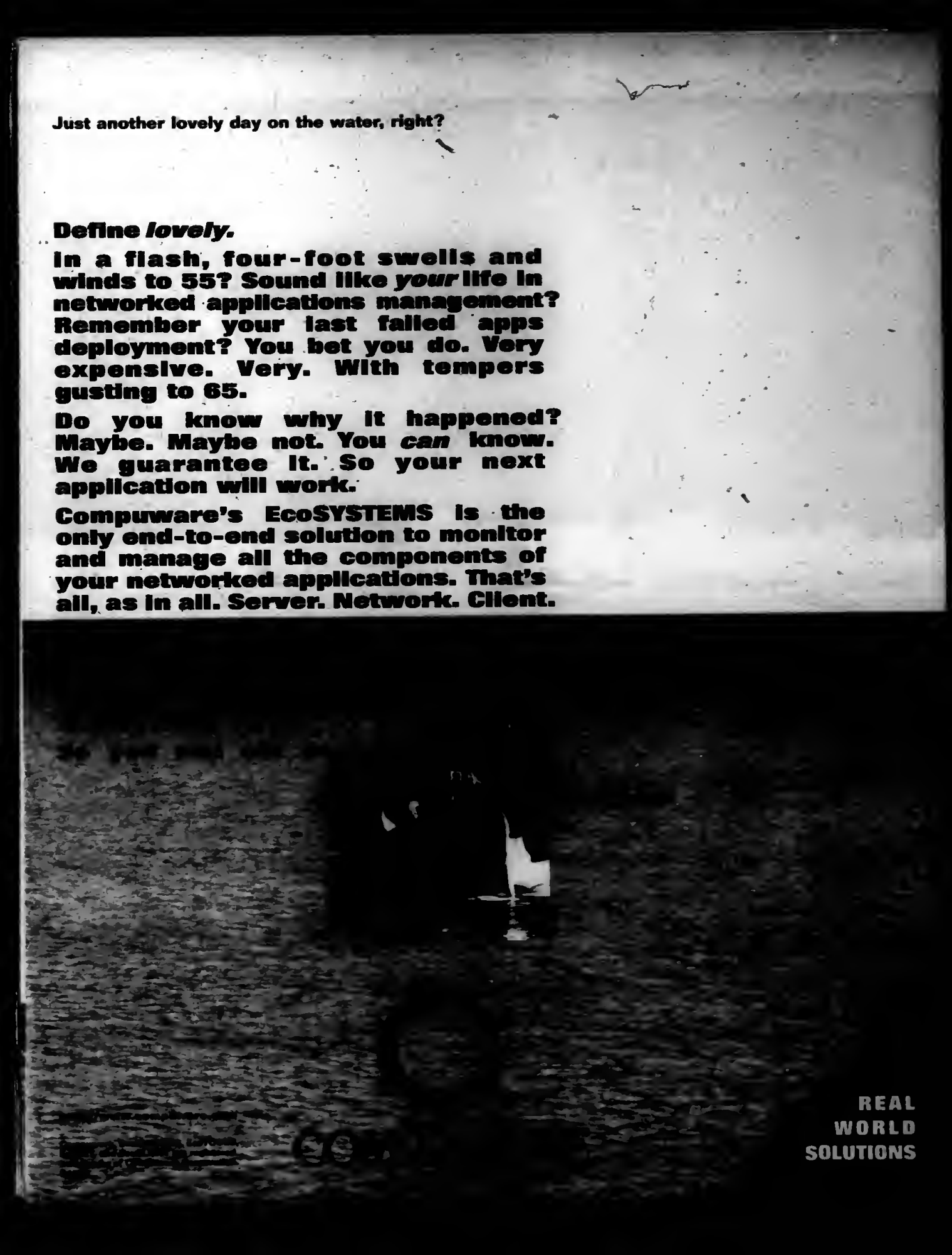
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Smart phones dial up data communications

By Mindy Blodgett

Picture a business traveler heading to the airport in the back of a cab.

She grabs her "smart phone" and makes a quick call back to her office, then uses the device's keyboard to access the Internet for information about the gate for her flight.

Just before she arrives at the airport, the telephone emits a beep, telling her she has a text message.

Some observers said the wireless industry finally has its killer application in last week's announcement from AT&T Wireless Services in Kirkland, Wash. The company has debuted a device that gives users wireless voice and data access to the Internet and corporate intranets.

Smart buy

The Yankee Group in Boston predicts that close to 2 million smart phones, or wireless intelligent handsets, will be sold within a year after the turn of the century.

AT&T PocketNet Phone, manufactured by PCSI in San Diego and equipped with software from Uowired Planet, Inc. in Redwood City, Calif., will provide two-way messaging and access to electronic mail and information such as airline flights and financial data via Cellular Digital Packet Data (CDPD).

AT&T officiala said the device, which will be available to corporate users later this year, will cost about $500, plus about $40 per month for airtime.

Mitsubishi Wireless Communications, Inc. in Sunnyvale, Calif., an AT&T partner, is adding the same capabilities to its MobileAccess phone.

What's in store

Industry analysts said the phones and services will give users unprecedented, flexible access to critical information. They also predict that the devices will advance the adoption of CDPD, a wireless data communications technology that hasn't lived up to its early promise.

"The significant thing about this announcemeot is that the device will be a key enabler for a lot of applications that will get quick informatioo into users' hands," said Robert Egan, an analyst at Gartner Group, Inc. in Stamford, Conn. "The typical business traveler is in the field making decisions about such things as financial markets, and the short messaging ability as well as Internet access of this device will be important."

Craig Mathias, an analyst at Farpoint Group, Inc. in Ashland, Mass., said the smart phones "are one of the things that can crack this wireless field right open — I think these are going to fly off the shelves."

"The important thing about this device is that it gives you great flexibility in a single package," he said. "CDPD has been rolling out networks more slowly than we thought, but these are the kiods of applications that can move this along."

Will it sell?

AT&T sees the device as a potential replacement for cellular phones and pagers. But will users be drawn to it?

Jack Frame, a vice president of sales at CoreStates Bank in Philadelphia, said the features are attractive, "but the price still seems a little steep. And do I really want another device? With laptops getting wireless capabilities, I'm not sure I need a device like this, and I don't know if I could convince my manager to spend $500."

And there are some puzzle piecea yet to fall together, analysts said. CDPD networks are still rolling out, and more interbilling agreements among rival wireless carriers are needed to give smart phone users nationwide access.

"They still have to work through some infrastructure and maturity issues in CDPD," said Dan Merriman, an analyst at Giga Information Group in Cambridge, Mass. "But this has the potential for being a very significant wireless solution."

IRS to require electronic filing

By Gary H. Anthes
WASHINGTON

The Internal Revenue Service this month is notifying 1.2 millioo companiea that they must begin paying business taxes electronically by year's end.

But according to a recent survey, thousands of companies are unprepared for the mandate, which carries a stiff 10% penalty for oncompliance.

Worse, thousands more may oot even be aware of the electronic payment requirement.

According to Automatic Data Processing, Inc. (ADP) in Roseland, N.J., less than one quarter of 500 companies surveyed are aware of the IRS regulation, and of those that know of it, most doo't yet know how they will comply.

Pay-up time

If a company deposited more than $50,000 in employment taxes in 1995, it must make all federal tax deposits via EFTPS* beginning Jan. 1, 1997. Larger companies are already required to pay electronically.

Employment taxes deposited	In calendar year	Payment deadline	Using
$47 million	1994	Jan. 1, 1996	TaxLink
$60,000	1995	Jan. 1, 1997	EFTPS
$50,000	1996	Jan. 1, 1998	EFTPS
$20,000	1997	Jan. 1, 1999	EFTPS

* Electronic Federal Tax Payment System

Source: Internal Revenue Service, Washington

"The first inkling that taxpayers have had about thia was a mailing begun by the IRS three weeks ago," said Carolyn Kelley, director of government affairs at the American Payroll Association here. "There has not been the kind of public awareness campaign that a change of this magnitude warrants."

Happy New Year

The regulatioo has already kicked in for 1,500 of the largest U.S. companies, which use an older system called TaxLink. But it really takes hold Jan. 1 when many small and midsize companies must comply (see chart).

Electronic payment is mandated when employment taxes reach a certain threshold, but ooce that level is reached, all business taxes must be paid using the IRS' new Electronic Federal Tax Payment System (EFTPS). That includes federal excise tax, unemployment tax, corporate income tax and several other levies.

Baptist Hospital in Nashville runa multiple payroll systems on its mainframe and has some at a service bureao. Karen Carter, EFTPS project manager, said Baptist Hospital has been using TaxLink, the predecessor to EFTPS, but must convert to EFTPS by Jan. 1.

That is a "major concern," Carter said. "There are 1,3 million taxpayers going onto EFTPS, a product that has never been tested by taxpayers." She said she just sent in the hospital's EFTPS enrollment form and ia waiting for EFTPS software from the IRS.

Though the concepts behind electronic payments are fairly straightforward, complying with IRS regulations will require close coordination among taxpayers' systems, payroll, accounting and tax staffs and between taxpayers and their banks.

The feds actually win plaudits for this health care system. See page 75.

Pick your poison

Companies that comply with the new IRS requirements for electronic filing must specify one of two payment options: debit or credit.

Under the debit option, the taxpayer initiates each payment by instructing one of two financial agents designated by the IRS to withdraw funds from the taxpayer's bank and route the money to a U.S. Treasury account at a Federal Reserve Bank.

With the credit option, taxpayers contact their banks and order them to initiate transactions for specified amounts. With either option, taxpayers may be able to initiate payments via Touch-Tone telephones, PCs or voice instructions.

Large firms with many tax payments may want to modify their systems to make payments automatically, said Slade Kobrin, a director at ADP.

No matter which option is chosen, coordination is key, said the American Payroll Association's Carolyn Kelley.

—*Gary H. Anthes*

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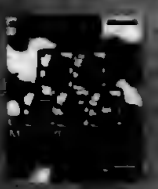

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Computer Industry

New leadership to light Candle's way

By Bob Francis

Closely held Candle Corp. has brought in a new president and chief operating officer to help it branch out into distributed systems management.

Robert J. LaBant, formerly an independent consultant and a senior vice president and general manager at IBM, was named to the newly created position last week.

"I believe CIOs have been charged with managing distributed systems [Unix and NT], and we need to give them the tools to do it."

Bob LaBant,
Candle president
and chief operating officer

Aubrey Chernick, Candle's founder and chairman, held those positions before LaBant.

LaBant's main charter will be to move Candle from a provider of centralized systems management products to products for new distributed Unix and Windows NT environments.

Candle last year already made moves in that direction with systems management products for Unix systems and agents for NT systems. Later this year, the company plans to add products to manage NT systems from NT servers, company officials said.

But Candle is following in the footsteps of some of its competitors. Legent Corp. is now part of Computer Associates International, Inc. and is moving quickly in the distributed systems management area. And IBM, with its purchase of Tivoli Systems, Inc., is also a major player there. Candle will have to both compete and partner with those two companies to make an impact in distributed systems management, analysts said.

According to LaBant, the Santa Monica, Calif., company will concentrate on developing products for Unix and NT operating systems in the next year. "I believe CIOs have been charged with managing these distributed systems, and we need to give them the tools to do it," he said.

According to International Data Corp. (IDC), Candle led the performance management market last year with a 13.6% market share, followed by Boole & Babbage, Inc. with 8.4% and Landmark Systems Corp. with 3.5%. The rest of the market was split among smaller players, said Paul Mason, an IDC analyst. Regarding the addition of LeBant, Mason said, "This is really Candle's best shot. If they don't make it now, they may very well slump."

According to Sam Albert, president of Sam Albert Associates, a Scarsdale, N.Y., consulting group, LaBant's ability to build partnerships should serve him well at Candle. "One of the hallmarks of his time at IBM was when he headed the AS/400 group and delivered a very successful product by building strong partnerships," Albert said.

The land of kilts and kilobytes

Scotland's 'Silicon Glen' faces nagging challenges

By Michael Goldberg
EDINBURGH

The University of Edinburgh, one of Scotland's most advanced academic centers for electrical engineering, is a barometer for this country's high-technology health.

The strengths are real. Scientists are teaching the next generation of semiconductor designers in the school's fabrication facility. Researchers work on projects to bring new technologies to the electronics and computer industries.

Yet there are nagging challenges facing Scotland's "Silicon Glen."

Just like high-tech companies in California's Silicon Valley, firms in Scotland face a seemingly unending demand for talent to improve existing products and to develop the next "big thing."

So, as fast as the university turns out graduates, industry looks for more people with higher levels of skill.

"Everyone in Silicon Glen sees that the quality of the people here is great but that we need more of them," said Bruce Diamond, managing director at National Semiconductor (U.K.) Ltd. in Greenock, Scotland, a city 25 miles west of Glasgow.

The U.K.'s plans, announced last week, to site a national microelectronics institute at Heriot-Watt University in Edinburgh is a start toward addressing the talent question, according to Diamond and executives at other electronics companies.

Lured by relatively cheap land and labor, tax breaks and government-sponsored promotions, dozens of high-tech companies from the U.S., Japan and Europe have bases in Scotland a nation of 5 million that is about the size of Maine.

National Semiconductor will invest $270 million over the next three years to expand a plant that makes chips for products such as antilock brakes.

IBM last month announced the expansion of its European PC service center in Greenock.

Motorola, Inc. makes chips for mobile telephones in South Queensferry, outside of Edinburgh. Nearby is NEC Corp.'s semiconductor plant. In Edinburgh, engineers for Hewlett-Packard Co. are working on chip design.

Semiconductor executives such as Rodney Griffiths, president of the European division of Applied Materials, Inc., said firms need to be poised for growth in spite of recent slumps in the book-to-bill ratio, the supply-and-demand formula for computer chips. "The use of semiconductors has grown and will continue to grow," he said.

The government estimates that Scotland has 7,300 workers in the country's seven semiconductor factories. And although Scottish universities train 3,000 students per year in electronics-related fields, people such as Clive Reeves, an electrical engineering professor at the University of Edinburgh, said more must be done.

"The companies here are expanding and the infrastructure has to be sustained around them," Reeves said.

Computer pioneer Hurd, 85, dies

Hurd

Cuthbert C. Hurd, 85, a mathematician who helped IBM develop the 701, the first general-purpose computer introduced in 1952, died recently at his Portola Valley, Calif., home.

Hurd joined IBM in 1949 to become director of applied science after a stint at the Atomic Energy Commission laboratory in Oak Ridge, Tenn. He later served as chairman of Computer Usage Co., the first independent software company, and as co-founder of Quintus Computer Systems, seeking to market artificial intelligence.

When he died, Hurd was chief scientist at Northpoint Software Ventures, Inc. in Framingham, Mass., a risk management software firm.

SURF'S UP AGAIN

Back by popular demand, the September edition of Computerworld's Internet Resource Directory will be used by IS professionals as they build their organizations' intranets and Internet links.

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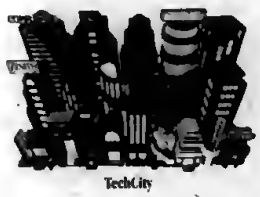

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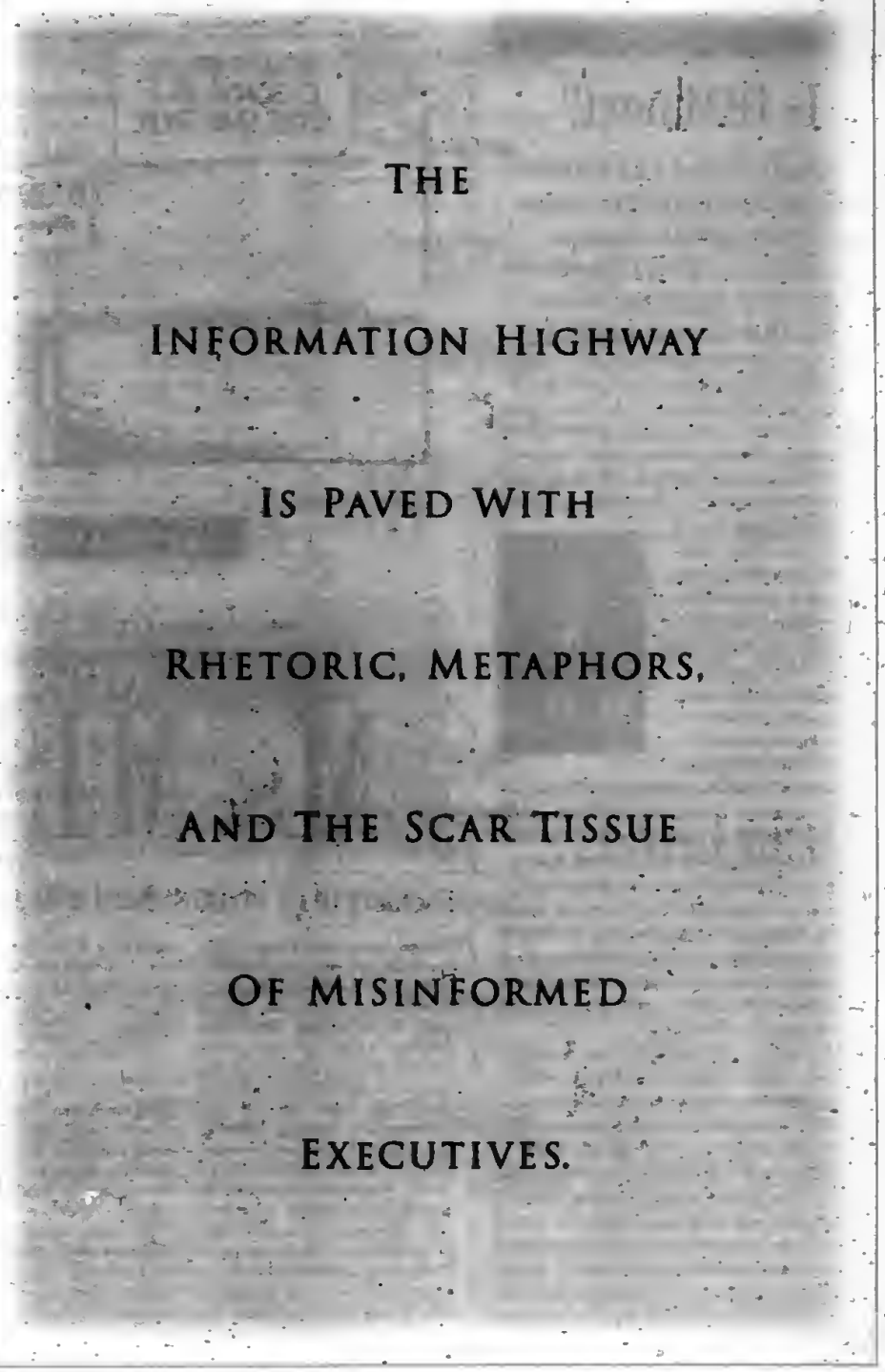

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Is IBM next?

In the past two weeks, a lot of brainpower has been focused on analyzing whether Digital Equipment Corp. is the next Wang Laboratories. I wonder if the bigger question is whether IBM is the next Digital.

When you consider the similarities in the two companies' situations, the analogy is hard to miss. Digital blames a lot of its recent troubles on slow sales of some PCs and an inability to meet demand for others, particularly its popular Ultralite notebooks. IBM's market share in PCs also has been falling steadily for the past year, and it's also unable to keep up with laptop demand.

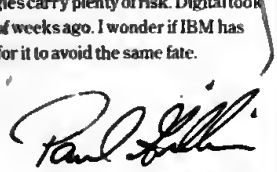
Digital is experiencing weakness in Europe. IBM is equally vulnerable, with 40% of its business in Europe. Digital is fighting against plummeting sales of its VMS platforms. IBM's legacy MVS systems are enjoying s bubble of strong sales, but no one expects the phenomenon to last more than a few years.

Neither vendor has a strong Unix message. Digital has a fast Alpha chip, but no vendor of any consequence supports it. IBM has the same problem with the PowerPC and a version of Unix that's considered one of the weakest in the market. Neither vendor has a compelling applications software story.

Of course, each vendor also has its unique problems. Digital's costs are still out of line, and it has been unable to get its reseller channels in shape. IBM is hemorrhaging in storage, which was once one of its biggest businesses, and has yet to figure out how to recoup its multibillion-dollar investment in Lotus.

Each also has strengths. Digital has close ties to Microsoft and Oracle and produced the AltaVista search engine, which brilliantly showcases Alpha performance. IBM has Integrated Systems Solutions Corp., the AS/400 and a lingering aura of customer loyalty.

Add them all up, though, and the bottom line is weirdly similar. These are two vendors trying desperately to make the transition from a disappearing legacy to some new world order. Yet neither has a dominant position in any of the markets that will define the future. They are fighting organizational inertia, bloated workforces and hawkish scrutiny from Wall Street. They are participating in the 2-year-old high-tech boom, but their long-term growth strategies carry plenty of risk. Digital took a hard fall a couple of weeks ago. I wonder if IBM has the magic working for it to avoid the same fate.



Paul Gillin, *editor*
Internet: *paul_gillin@cw.com*
www.ultranet.com/~pgillin

'Sexism in IS' strikes chord with readers

I found Laura DiDio's article "Sexism in IS: Not gone, not forgotten" [CW, June 24] very interesting. I definitely do not dispute your general point but do wonder about some numbers behind the 1995 survey that was included in her article. For example, it states that the IS population is 30% women and 70% men. However, it is commoo knowledge that high schools do not encourage women to pursue technical careers. Hence, women probably are less interested in IS than men.

So do women have a harder time or an easier time getting an IS job then equally qualified men? This is of special interest to me because my wife is majoring in computer science. I've often maintained that she should be able to get a better salary than I did starting out, because being a female would be an asset in IS because of the lack of supply. I firmly believe that women are an asset in IS, not as tokens, but because women are different from men and would probably be better at coding toward the female consumer. (I hope you don't find that sexist.)

Furthermore, I would find it more revealing if the salaries being compared were for the same experience level — for example, to compare average salaries for men and women with five, 10 and 15-plus years of experience.

Ben Hocking
Atlanta

I very much appreciated your article on sexism in IS. I have had an interesting experience in my own workplace that shows how utterly pervasive sexism is among men and women.

The senior staff in this organization's information systems unit has a combined experience base of over 40 years in networks and all types of computers. We not only run — very successfully and cost effectively — a multiplicity of networks, but we designed the automation from the ground up. The last two fiscal directors who took positions here both fancied themselves big-time computer hackers. One could not get beyond his Mac, and the other cannot get beyond learning AmiPro. Yet our organization's staff is impressed with their amateurish analysis, based mainly on monthly readings of *PC Magazine*. And now the organization staff regularly questions the IS staff's decisions based on these fiscal directors' "erudite" insights.

J. Evelyne Nahrgang
Washington

I enjoyed the recent Ms. MIS article but found it ironic that, four pages later, the next article in the issue was titled "Real men don't use Web tools." It was especially ironic to me because the only person in our MIS department doing any Web scripting at all is a woman.

Lou Little
Portland, Ore.

I agree with almost everything in Laura DiDio's article. The only exception I have is that we [women] seem to allow our spouses to get away with similar behavior.

My women friends are consistently amazed at the amount of cooperation I receive from my husband. He understands the long hours, the crazy schedule, etc. If he needs to work long hours, I fill in the gaps at home. He understands that it is not inherently my job to care for the children and the house.

Women need to take some responsibility for the nature of how families run. I appreciate the advice to stand your ground. It's hard, but it works. It's the only way things will change.

Nancy Campbell
Denver

More letters on sexism, *page 40*

■ Computerworld welcomes comments from its readers. Letters should not exceed 200 words and should be addressed to Paul Gillin, Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931. Internet: letters@cw.com. Please include an address and phone number for verification.

Verbatim

FROM A BULLETIN BY META GROUP, INC. IN STAMFORD, CONN., ABOUT THE SALE OF DUN & BRADSTREET SOFTWARE TO BAIN CAPITAL, INC.:

While [this is] a reasonable deal for Bain Capital . . . we are concerned about Bain's lack of [interest in Dun & Bradstreet Software's] SmartStream client/server-based systems. Users should therefore avoid further SmartStream commitments until the smoke from this "in limbo" acquisition clears.

We believe the spin-off . . . will cause SmartStream to atrophy as a product line.

FROM A REPORT BY DONALD A. DEPALMA, SENIOR ANALYST AT FORRESTER RESEARCH, INC. IN CAMBRIDGE, MASS.:

Internet search engines like Yahoo and . . . AltaVista will recast the database and data warehousing markets beginning in 1997.

[Large] companies are struggling to get all their corporate information — both structured and unstructured — into their decision-making process. Eighty percent of their business intelligence is still in documents, not in SQL databases.

Internet search engines will pry open this untapped asset — and leave traditional database vendors like Sybase, Oracle and IBM pigeonholed in a much smaller role for managing only structured data.

The Internet enables armies of users equipped with search engines to get to a wide variety of information. Most of it will be in text files, not Oracle or DB2 warehouses. What users want is access to both multimedia and structured data, all through the same browser interface. User reliance on search engines like Yahoo for information access means a hugely diminished role for server databases that are limited to structured data — which is just about the entire relational database industry.

Users will get zapped by browser plug-ins

Mel Baiada

The plug-in architecture offers lots of sizzle, but it violates the Web's cross-platform openness.

With the release of the Navigator 2.0 Web browser, Netscape Communications Corp. introduced the "plug-in" browser architecture. Plug-ins are chunks of Internet-downloadable code that allow users to run animation, video and audio programs within the browser window.

There's no doubt that these plug-ins — such as Acrobat, Shockwave and RealAudio — are flashy enhancements to the basic Web browser. But there are serious drawbacks to the plug-in approach. It has the potential to shackle users to a proprietary architecture and runs counter to the fundamental openness of the Web.

Netscape introduced the plug-in concept to entice third-party developers to add dazzling functions that would make the Netscape browser even more pervasive than it already was. The logic is simple: Make it easy for users to get feature-rich software that works with only your browser.

Most plug-ins are available only for Navigator 2.0 running on Windows-based PCs. They have to comply with Netscape's plug-in application programming interface. A few Macintosh-compatible versions are being developed, but no plug-ins have been developed for Unix-based systems, and few (if any) plug-ins are cross-platform.

In other words, because most plug-ins run only in the native Windows environment, they paint users into a proprietary corner. That's fine for Windows-only intranets, but it isolates users from the wide-open, public Internet.

There are other problems with plug-ins. Pundits say we're moving away from the "fat client" syndrome. But the slimmed-down network computers probably won't be able to run Windows or plug-ins.

Analysts at Meta Group, Inc. recently questioned the maturity of plug-in technology. During one demonstration, a single plug-in caused the browser to crash. If a browser is made unstable by a single plug-in, imagine the risks of running multiple add-ons simultaneously.

The Web gained acceptance so rapidly because of its near-universal availability, ease of use, graphics, information content and platform-independence. The Hypertext Markup Language (HTML) and Hypertext Transport Protocol (HTTP) are the open technologies that made it all possible. With the addition of Common Gateway Interface (CGI) gateways and executables, as well as the ability to bind HTML to databases, Web sites have gone from being mere billboards to systems capable of real business transactions.

Now we have the much-hyped arrival of the Java programming language. Although Java is essentially a fancy plug-in, it's platform-independent, so it enables developers to create "write-once, run-anywhere" applets. We'll be better off building applications with the alphabet soup of HTML, HTTP, CGI and Java — all open technologies — than with a hodgepodge of plug-ins.

History has a thing about repeating itself, even in the computer industry. Often we've seen promising technology lead us from one proprietary regime to another. PCs and Windows "saved" us from IBM mainframes but delivered us to Microsoft's door.

The Web presents us with a new opportunity. We must guard against veiled lock-in strategies and resist the temptations of flashy, quick fixes. The future of the Web lies in open tools, components and executable content. Today's proprietary plug-ins can't keep pace.

Baiada is president of Mount Laurel, N.J.-based Bluestone, Inc., a provider of advanced application development products, training and services.

PC upgrades: The good, bad and ugly

John Gantz

Outsourcers may be costly and slow, but they force unruly PC users to clean up their acts.

As a research outfit, my company keeps tabs on the $10 billion outsourcing market. It's big; it's growing; it's dynamic. And one of the hottest segments is the outsourcing of PC administration and upgrades, where the growth rate is more than 45% a year.

This month, we became one of our own statistics. We embarked on a companywide upgrade from a hodgepodge of PCs and Macintoshes to a standard set of hardware and software. And we chose an outsourcing vendor to do the job.

This upgrade has had its problems. One unkind (and unjustified) view among end users is that only our own information systems group could have screwed up this task more than the outsourcing vendor has. But the reality is better than the perception. All told, this upgrade isn't going too badly. We'll have new PCs and software on every desk *well* before the year 2000 problem stops us in our tracks.

In theory, IS managers choose to outsource desktop PC services because the outsourcer will cost less, offer faster service and provide expertise unavailable in-house.

These are all nice reasons, but none of them are true. Our upgrade is going to cost more and take longer than it would have if we did it in-house. After the first system cutover, it was clear that our IS staff knew more about desktop computing than the outsourcer. Ultimately, this will be a higher quality upgrade than if we had done it ourselves, but the reason will be our own preparation, not the skills of our outsourcer.

Despite the problems, using an outsourcer was a stroke of genius on the part of our IS group. Here are five reasons why:

- Using an outsourcer made us get organized. End-user departments took the upgrade much more seriously because we had hired guns coming in. We took inventory. We planned. We even went to training classes.
- The outsourcers made our IS staff look good. It was *our* guys who taught the outsourcers about plug-and-play technology problems. It was *our* guys who found lost files and diagnosed keyboard and monitor problems.
- The prospect of chargebacks for user-caused problems, such as missed training, brought discipline to an unruly end-user bunch. We'd mutiny if our IS group did that. The hidden costs of PCs are fully exposed — ugly, but in clear view.
- End users can see what's going on. Our IS group generally labors in obscurity except when it's laboring under unfair bad press. By using an outsourcer, spending on IS has become an "investment in infrastructure" rather than a necessary evil or black hole. We know more about our IS group than at any time since we got our first LAN.
- We're upgrading PCs companywide instead of piece by piece. Now, perhaps because we're trying to get companywide electronic mail and groupware, we're getting everyone to the same place at once.

Yes, outsourcing costs more, and we could do this better ourselves. But left to our own devices, we wouldn't be as disciplined. Signing up an outsourcer is like hiring a cleaning service. You have to straighten up first to get your money's worth.

The best approach might be a blend of the two: Set up your IS group as an independent outsourcing firm and sell services back to your company on a project basis. Then, your IS group might finally get some respect.

Gantz is senior vice president at International Data Corp. in Framingham, Mass. His Internet address is jgantz@idcresearch.com.

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Sexism in the IS workplace takes many forms

I just read Laura DiDio's column in the June 24 issue of *Computerworld* and thought it daring and insightful. I wanted to let you know about a different form of sexism going on in the workplace.

I'm a male-to-female transsexual who transitioned on the job about 3½ months ago. Since that day, I have gotten a look at the worst forms of sexism. I've found harassment. I've found myself fearful of people I once worked with harmoniously. The worst part of it is I have absolutely no recourse whatsoever. Transsexuals are absolutely unprotected in our workplace. The U.S. Supreme Court has determined in more than one case that firing a transsexual is not sex discrimination, but sex *change* discrimination. It is not protected by Title VII of the Civil Rights Act.

My company has been very supportive. When I informed my company's vice president of my impending change of gender, he promised me complete support and reassured me that my position was solely based upon qualifications and merit, not gender. But the problems aren't with management. It's with my co-workers. People who used to talk to me now look through me when we pass in the halls. The harassment is subtle and impossible to recriminate against.

Gwendolyn P.
Systems analyst
Chicago

I was immediately struck by the layout of the table of contents in your June 24 issue. It seemed particularly ironic to me that Laura DiDio's Ms. MIS column should address the problem of sexism in the computer industry and be promoted with a 1-in. photograph of her displayed next to a 4-in. photograph of a man (for a different story). Visually, her words were diminished before I even got a chance to see them.

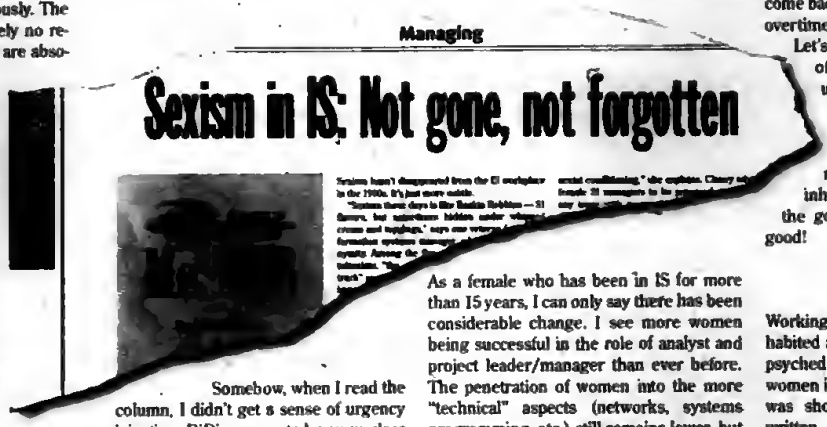
Somehow, when I read the column, I didn't get a sense of urgency or injustice. DiDio presented a very clear inequity in pay between men and women, and yet I didn't feel outraged or even spurred to action. Instead, I felt relieved that I was not a woman in Venezuela or some other really repressive place.

I'm a man in the computer industry and unlikely to occupy a position in management (I'd much rather write code). But when I hear about gender bias in the workplace, I get angry. I'm not the one discriminated against, but I do feel outraged that capable, competent people are not getting the salaries they deserve.

I've been managed by women and men, and I've had good and bad experiences with both. But I find that, overall, I prefer working for a woman and that I work better with women. I'd hate to see someone discouraged from participating in the computer industry because of sexism. I'd like to have seen you take a stronger stance against it.

Stephen Beitzel
San Jose, Calif.

Managing



As a female who has been in IS for more than 15 years, I can only say there has been considerable change. I see more women being successful in the role of analyst and project leader/manager than ever before. The penetration of women into the more "technical" aspects (networks, systems programming, etc.) still remains lower, but this seems to be by choice.

It might be very interesting to have a different perspective from an employer's/manager's viewpoint: Do women perform differently in their role as IS professionals? Are they easier or more difficult to manage? What jobs do they have a higher success at and why?

Jeri Bender
Nestec S.A.
Switzerland

I am not denying that sexism exists in IS, although I personally have not seen it in my 19 years. However, I question the validity of the statistics that were graphically portrayed in Laura DiDio's column. I have the feeling they may be misleading.

What I would like to see is the salaries of men and women correlated to the number of years' experience and the number of job hops, because both of these affect one's salary in a positive way. I would like to see the IS population figures correlated to how many of each gender apply for IS positions. The way I would interpret those graphs is that many more men than women apply for IS positions (at least in the past this was so). Men have accumulated more experience and have aggressively pursued better job opportunities, thereby increasing their compensation level.

Brent D. Holm
Unix system administrator
Blue Cross/Blue Shield of Oregon

I enjoyed your article and offer additional information and a point of conflict. First, I'm a card-carrying feminist male. I've been through all of the right sensitivity and culture classes, starting back in high school. I believe strongly in the equality of the sexes, equal pay, equal opportunity and so on. So I would like to point out that the male Machiavellianism you cite seems to be in the culture of large, East Coast establishments. The farther west you go, and the smaller the company, the less blatant and overpowering the oppression.

Our point of conflict, though, is economic. As an employer, I am interested solely in the return on investment for all assets. Given the choice of investing a) in a male who will probably be around and completely attentive for the next five years, or b) in a female who is known to be interested in taking time out to have a family and may well come back only part time (and certainly not overtime!), which would you choose?

Let's not confuse the economic realities of the marketplace (which none of us has any control over) with fairness and family life. The two are at odds, and the pay scales of young, childbearing females are more a reflection of that than any inherent bias in the system. Keep up the good work, though. Your cause is good!

Barry Demchak
La Jolla, Calif.

Working in an industry predominantly inhabited and controlled by men, I was very psyched to read Laura DiDio's article on women in IS. The chart on salary disparity was shocking, and the piece was well-written.

After reading that great article, I turned to read another interesting piece — written by a woman — about World Wide Web tools. However, the cover line, title and accompanying artwork really bugged me: "Real men don't use Web tools." The "just kidding" disclaimer did nothing to appease my annoyance. Your choice of title does nothing to dispel the myth that webmasters are or should be men.

Diane Anderson
San Francisco

When I first saw the "Real men don't use Web tools" headline, I thought maybe it was going to contrast the preferences of male and female webmasters or was about some newfound male hangup similar to not asking directions. It turned out that the headline really is representative — the article is almost entirely about male webmasters. Does this accurately represent the proportion of female webmasters/HyperText Markup Language (HTML) composers? Does it say more about who within an organization is apt to claim the title of webmaster or who is most likely to read your magazine?

It particularly surprised me that more women weren't included in the article because the creative, HTML-authoring side of the Web is very much a communications/marketing function, where one is fairly likely to encounter a high proportion of women. The headline is cute, but it contributes to stereotyping in the workplace that's ultimately detrimental to women.

Kelly Smith
National Drought Mitigation Center
University of Nebraska
Lincoln, Neb.

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HOSPITAL MERCY

FICHA DO

Carlos P

Carlos Prosperi deu entrada na emergência às 19:00 horas no dia 24/11/81. Foi vítima de um acidente de carro aproximadamente às 18:30 horas. Atendido pelo Dr. Bandeira. A sua mão esquerda ficou presa na porta do carro, que abriu e fechou durante o acidente. Ao ser internado, tinha dores e sangramento na mão esquerda. Havia suspeita da existência de várias fraturas e foram solicitados Raios X.

Track 34

Track 35

Track 36

World Stock Index
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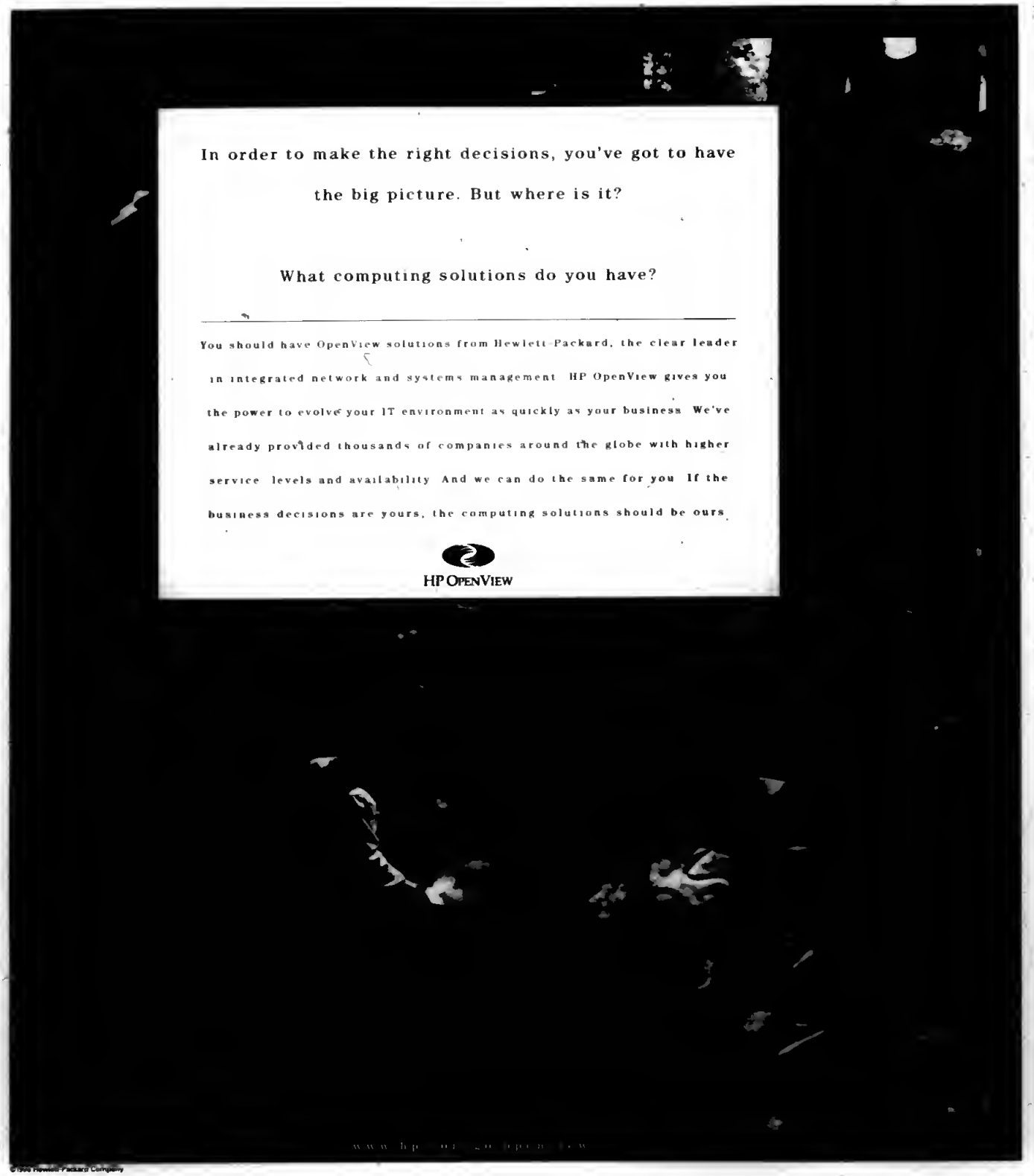

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Ticketing Act ticketing helps the show go on. 47

Servers & PCs

Multimedia makes the grade

Colleges roll out big hardware guns to handle apps

By Craig Stedman

Colleges and universities are starting to act as test beds for networked multimedia technologies that should soon be deployed in corporate workplaces for training and other uses.

And lesson No. 1 is already clear: When you want to shoot multimedia data across a network, get out the big hardware guns.

Multimedia data on a network offers the potential for a more flexible and dynamic environment than is possible now with CD-ROMs that are sent to end users. But information systems departments have to make sure their servers and networks don't get bogged down by images and full-motion video clips.

At Rensselaer Polytechnic Institute (RPI) in Troy, N.Y., this need for ample power translates into a three-tier architecture scheduled to go live in time for the fall semester. RPI's setup will hook desktop and mobile PCs to IBM RS/6000 Unix servers that, in turn, are connected to a data repository on an IBM mainframe.

"We don't want to deliver wheelbarrow loads of CD-ROMs all over the place. That's insane," said Jack Wilson, dean of undergraduate and continuing education at RPI. The school also wanted to create a campuswide multimedia system that would let its 4,000-plus undergraduate students access multiple academic departments from a common environment.

But the students are expected to tax the system with up to 6,000 hours of use per week, Wilson said. That forced RPI to design an architecture that would be reliable and pack plenty of punch.

Marist College in Poughkeepsie, N.Y., initially planned to use PC servers for a multimedia network that got limited use last year and will expand to include more courses in the fall.

"When you see the size of images involved here, Ethernet gets swamped pretty quickly."

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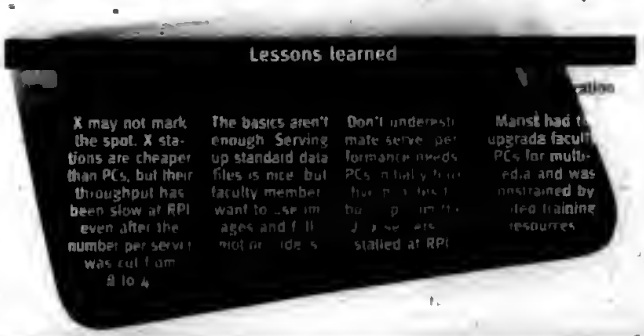
But as Marist tried to scale the system during development, it "started to run into hardware performance limitations," said Carl Gerberich, vice president of information services at the school. "We found out that for what we wanted to do, that level of server was more in the way." So, Marist switched to a two-tier multimedia network with a mainframe as its server.

Within RPI's three-tier architecture, the RS/6000 Unix servers will be used by separate departments to cache multimedia data that is heavily in demand. John Kolb, RPI's dean of computing and information services, said he hopes that will provide fast enough access to the data and still allow IS personnel "to control things from a megaserver" at the mainframe.

RPI and Marist also plan to use Asynchronous Transfer Mode switches to handle some of their multimedia feeds. "When you see the size of the images that are involved here, Ethernet gets swamped pretty quickly," Kolb said.



New applications on the way for the

PDA

By Mindy Blodgett

Users of handheld computers and personal digital assistants (PDA) frustrated by the lack of applications and options will soon get some relief.

IBM recently introduced handheld computers for specific vertical industries that, for example, offer a choice of wireless providers. And industry observers are eagerly awaiting the release of a mobile operating system from Microsoft Corp. Codenamed Pegasus, the system features a point-and-click menu and will have easy connectivity with Windows 95 and Windows NT, sources said.

"Pegasus is expected to be a true desktop extender with its interoperability with Windows 95 and NT," said Timothy Schmidt, an analyst at Encore Consulting Group, Inc. in Longwood, Fla. "And that is what people are looking for with their PDAs and portables — they need better connections to the desktop."

Pegasus is expected to be announced later this summer.

Hold on to your hats

Compaq Computer Corp., NEC Technologies, Inc. and Hewlett-Packard Co. are considering developing devices using Pegasus, analysts said. Microsoft officials said they hope to aim the operating system at devices less than $500.

If Microsoft enters the PDA and mobile device market, it could cause an explosion in PDA and mobile usage, observers said.

Meanwhile, IBM recently released wireless computing devices aimed at various vertical markets, including warehouse, manufacturing, field-data collection, hospital, financial services and retail.

The most recent release was the IBM 4612 Sure Point Mobile Computer, which is available for a starting price of about $3,445. The portable, pen-based system was devised with retail employees in mind, according to company officials.

The wireless device allows employees to switch tasks and access information wherever they are located within a building or store. It has an integrated microphone and speaker for voice applications. It also has PC Card slots that allow for a choice of wireless radio providers, including RAM Mobile Data USA L.P. and ARDIS Co., as well as Cellular Digital Packet Data providers.

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IBM 4612 Sure Point Mobile Computer

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Sievers said he isn't sure if the company will buy the computers but added, "We have been looking at wireless for years, and this device seems to give us a lot of what we want.

"My dream is for a completely wireless, cashless restaurant someday," Sievers said. "We're very excited about the possibilities."

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Ticket/ct Act ticketing helps the show go on, 47

Servers PCs

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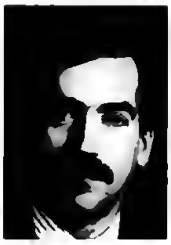

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Lessons learned

What RPI and Marist have learned about [illegible] education

- X may not mark the spot. X stations are cheaper than PCs, but their throughput has been slow at RPI even after the number per server was cut from 8 to 4.
- The basics aren't enough. Serving up standard data files is nice, but faculty members want to use images and full-motion videos.
- Don't underestimate server performance needs. PCs initially took five minutes to boot up from the Unix servers installed at RPI.
- Marist used to upgrade [illegible] PCs for multimedia and was constrained by limited training resources

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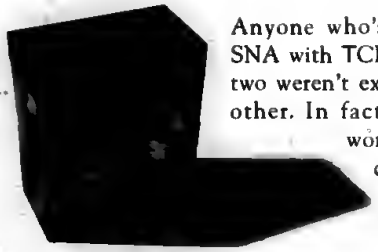

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ACT ticketing system helps make sure the shows go on

Parallel processing system handles high-volume, time-critical ticket sales

By Gary H. Anthes
MONTREAL

When pop star Michael Jackson schedules a concert in Canada, a parallel processing, fault-tolerant computer is just the ticket.

"There could be 5,000 outlets in Canada selling Michael Jackson tickets. If they go on sale at 9 a.m., at 9:30 you could have 2,000 people all pressing 'enter' at the same time," said Danny Lok, a vice president at Access Control Telematic, Inc. (ACT).

In addition to having a system that can handle that load, "it is important not to sell two tickets for the same seat," Lok said.

Not to worry. ACT's Tandem Computers, Inc. Himalaya system doesn't choke on 2,000 simultaneous ticket requests. "It gives us data integrity, fault tolerance and lots of processing power," Lok said.

The special characteristics of high-volume, time-sensitive ticket sales have turned out to be a good fit for ultrareliable parallel processing systems.

Follow the ticketing road

Ticket sales are "a leading indicator" of where many applications are heading, said Jim Johnson, chairman of The Standish Group International, Inc. in Dennis, Mass. "It's just a faster and faster world we live in, and parallel processing for mission-critical applications is becoming more and more of a requirement."

ACT sells its ticket software to other organizations, some of which have also opted for parallel processing systems. El Corte Ingles in Madrid has run ACT's ticketing software on a Tandem machine for the past

four months, using it to sell 100,000 tickets to shows and bullfights across Spain.

According to Enrique Garcia Casas, IS manager, the company's system replaced many local and mostly manual systems.

"The advantage is that now we can sell tickets all over Spain on one system and have the data consolidated onto one machine," Casas said.

The Toronto Blue Jays organization uses a Tandem computer in its in-house ticketing system, and the baseball club may soon migrate to the Tandem-based ACT system. "Availability is critical," said Hans Frauenlob, manager of information systems at the organization. A ticket sale postponed because of downtime may be lost forever, he explained.

Frauenlob said the Blue Jays' two-processor Tandem CLX 820 can easily handle peak loads, even on the day season tickets go on sale. "And scalability is always there; tons of headroom is there," he said.

Peak performance

A Himalaya with 16 processors can spawn 400 "instances" of a program running in parallel at times of peak demand, Lok said. The machines run order processing software written by ACT in C and C++ that is optimized for parallel processing.

The computers also run Tandem's NonStop Kernel operating system and the NonStop SQL database management system.

ACT, a $5 million start-up based here, specializes in systems for selling theater, sports and concert tickets and administering the databases of attendees maintained by event sponsors. Smaller organizations with mostly local sales can buy the company's TicketAct software to run on an in-house LAN with a Windows NT server.

ACT has about a dozen Tandem users and about 40 NT customers, Lok said. Most are in Europe and South America, but ACT is aggressively pursuing Canadian and U.S. customers.

New Products

PixelVision's *flat-panel monitor*

PixelVision Technology, Inc. has introduced a flat-panel monitor, Model PV116SX.

According to the Acton, Mass., company, the 16-in. display is 3 inches deep and can replace a CRT monitor of any size and any resolution without changing the existing system's software or hardware.

PV116SX features high contrast and brightness, on-screen menu controls, 1,280 by 1,024 resolution and a color palette of 2 million colors.

It is also available in finger- and pen-touch input versions.

Pricing starts at $9,850.

▶ *PixelVision Technology*
(508) 264-9443
www.pixelvision.com

SAS Institute, Inc. has announced Scalable Performance Data Server, a high-speed parallel processing data server.

According to the Cary, N.C., company, the product lets companies with large amounts of data build data warehouses that quickly analyze and deliver information to users. It is a multiuser server that can be used to store SAS data sets, views and catalogs as well as indexing alternatives.

Scalable Performance Data Server is licensed on an annual basis with fees determined by server size. First-year fees start at $25,000.

▶ *SAS Institute*
(919) 677-8000
www.sas.com

Panasonic Computer Peripheral Co. has introduced PanaSync S21, a large-screen color monitor, and PanaMedia PM17, a multimedia monitor.

According to the Secaucus, N.J., company, PanaSync S21 has a 20-in. viewable image size with 1,600 by 1,200 maximum resolution and 0.25 fine dot pitch. It includes eight preset timing modes and 13 user-memory modes. It costs $1,699.

PanaMedia PM17 has 3-W speakers built in to the monitor for multimedia capabilities. It has 1,280 by 1,024 resolution with antiglare, antireflection and antistatic characteristics. It also has on-screen display menus that let users customize the size, geometry and color of the picture in different languages. It costs $729.

▶ *Panasonic Computer Peripheral*
(201) 348-7000
www.panasonic.com

Winchester Systems, Inc. has announced an upgrade to its FlashDisk RAID product.

According to the Woburn, Mass., company, FlashDisk RAID uses an Intel Corp. 486-based caching controller with up to 32M bytes of cache RAM to deliver up to 6,000 I/O operations per second. It holds up to five disk drives, with a total capacity of 21.5G bytes. The FlashDisk RAID upgrade has redundant power supplies that can be hot-swapped from the front of the unit without shutting down the storage array or server.

Pricing for the FlashDisk RAID upgrade starts at $11,467.

▶ *Winchester Systems*
(617) 933-8500

Product short

Pinnacle Micro, Inc. announced Tahoe 640, a 3.5-in., 640M-byte removable optical drive. It can store up to 640M bytes of data on a rewritable disk and is compliant with the major International Standards Organization, American National Standards Institute and ECMA industry standards. It costs $799. Removable cartridges cost $69 each. Pinnacle Micro, Irvine, Calif. (714) 789-3036, www.pinnaclemicro.com.

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Sterling answers storage management call

By Jaikumar Vijayan

Storage vendors are responding to growing user demand for centralized management of distributed multiplatform storage operations with a spate of new products. The latest is Sterling Software, Inc.'s Sams: Expert 3.0 storage management software for Unix, Windows NT and Novell, Inc. NetWare environments.

Sams: Expert 3.0, which is shipping, lets administrators centrally monitor and manage storage subsystems in each of the three operating system environments. It does this by combining a centralized view of the network with online, interactive reporting.

The product automatically scans the entire storage system at user-defined intervals and generates information about the kind of data that resides on it, where it is stored, who is using it and how and when it is used. All of that occurs from one central point, said David Halterman, product marketing manager at Sterling in Sacramento, Calif.

Sams: Expert 3.0 supports

CENTRALIZED MANAGEMENT ACROSS MULTIPLE PLATFORMS: Lets administrators manage storage without moving from application to application or server to server.

ONLINE, INTERACTIVE REPORTING: Helps identify what data is stored, where it is, who uses it, how it is used and when.

CROSS-PLATFORM QUERIES: Data can be managed consistently. Administrators don't have to write individual queries for each platform.

More for your money

This kind of management capability aims to help users reduce storage management costs and improve capacity planning for hardware and labor.

"What it gives me is a tremendous amount of [storage management] information that I wouldn't have been able to generate on my own," said Charles Magruder, resource administrator at Attorney's Title Insurance Fund in Orlando, Fla. This makes it easier to manage storage devices across the enterprise, he said.

Prices start at $17,500 for a dedicated Windows-based application server and a five-node Windows NT or NetWare license. For Unix environments, pricing starts at $20,000.

Similar products with varying degrees of management capabilities are available from vendors such as IBM, Legato Systems, Inc. and Cheyenne Software, Inc.

Attorney's Title Insurance, a beta-tester of Sams: Expert 3.0, is currently migrating applications off mainframes to a distributed Windows NT and NetWare environment. "I don't need to learn all the underlying stuff to get the information I want. Point and click is all it takes," Magruder said.

Automatic deletion

With a Windows-based graphical user interface, Sams: Expert 3.0 also allows administrators to manage storage devices within user-defined thresholds. When the software detects a problem, it automatically initiates user-specified storage tasks to correct it.

For instance, when a server exceeds its space threshold, Sams can be programmed to automatically delete all temporary files on the server. Online status views give administrators information on obsolete or unused files that can be deleted if necessary.

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Briefs

HP inks deal

Hewlett-Packard Co. in Palo Alto, Calif., has signed a marketing and development deal with **Insignia Solutions, Inc.** in Andover, Mass., to use Insignia's NTrigue server to let HP workstation and X terminal users run 16- and 32-bit Windows NT software.

Bull charges in

Groupe Bull is making its PowerPC-based Sagister Unix clusters available in the U.S. The Sagister line, which links up to eight of Bull's four-processor servers, was introduced in March but had been limited to the European and Asia/Pacific markets. The clusters support up to 5,000 active users and can be preconfigured with software from vendors such as SAP AG and Oracle Corp.

Unisys' Aquanta servers bask in summer sun

Unisys Corp. in Blue Bell, Pa., has announced its Aquanta suite of servers for World Wide Web and intranet applications that use the Solaris operating system from Sun Microsystems, Inc. The products, to be rolled out this summer, include an Aquanta Internet server, an Aquanta Security server with firewall software and an Aquanta Application server for client/server networks. Pricing for the servers, which use Intel Corp. Pentium or Pentium Pro processors, wasn't available.

A Sequent deal

Sequent Computer Systems, Inc. in Beaverton, Ore., has signed a deal to bundle **Open Market, Inc.**'s Web servers with its Symmetry 5000 hardware.

Compaq has simpler lineup

Compaq Computer Corp. in Houston plans to drop its low-end ProLinea line of corporate desktops. It will standardize on DeskPro as the brand name for its business-class PCs. The firm recently began its brand consolidation when it announced two portable lines under one name, Armada. Compaq will do the same for the corporate desktop when it introduces a line of DeskPros that will span from an entry-level model priced near $1,000 to high-end Pentium Pro systems, sources said.

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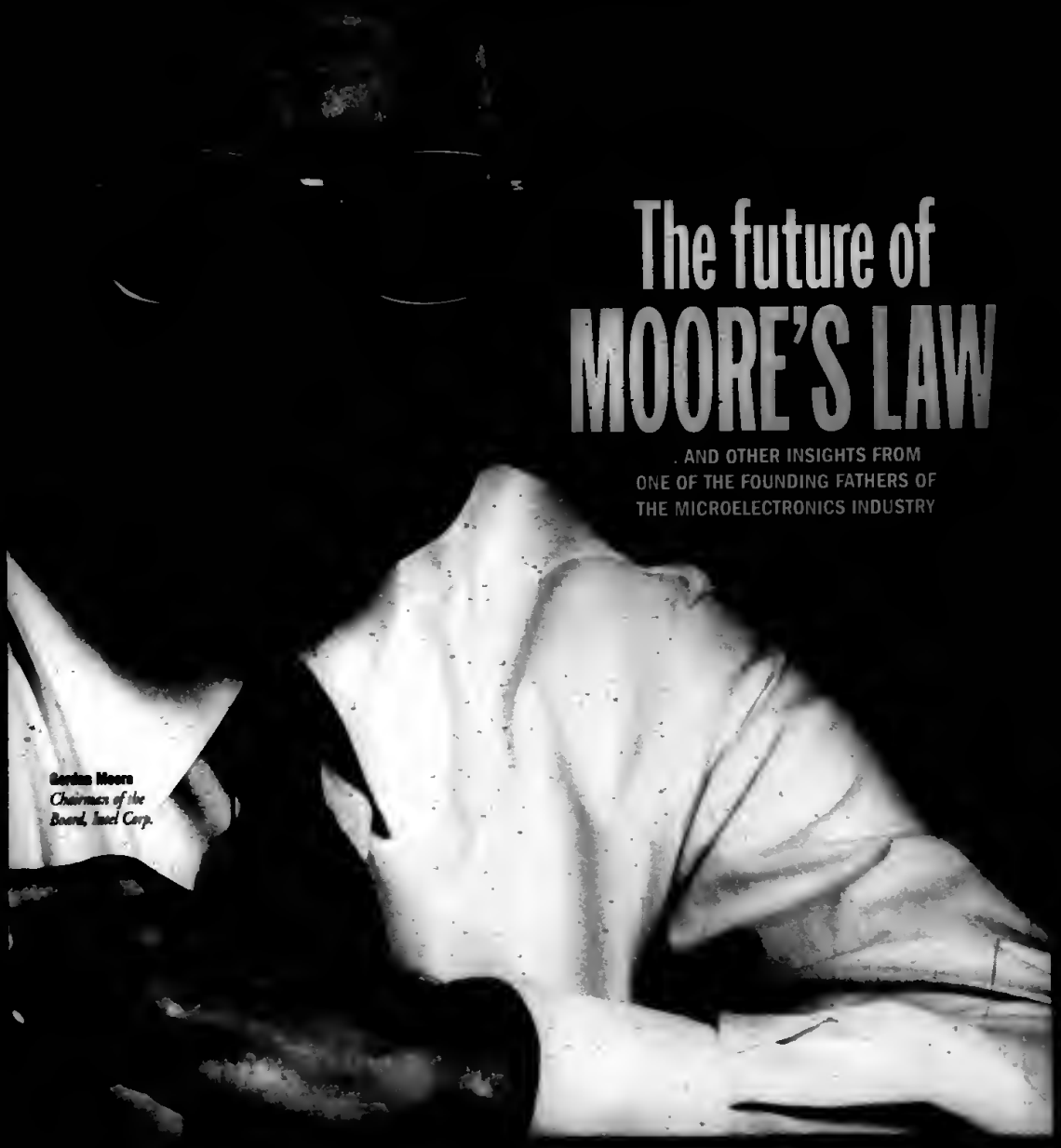


The future of MOORE'S LAW

. AND OTHER INSIGHTS FROM ONE OF THE FOUNDING FATHERS OF THE MICROELECTRONICS INDUSTRY

Gordon Moore
Chairman of the Board, Intel Corp.

Can Moore's Law continue indefinitely?

Probably not, says Intel Chairman and Co-founder Gordon Moore. Technical and business limitations will soon present real problems to the "law" that states chip density doubles every 18 to 24 months. Falling off the curve has implications for everyone in the silicon food chain, including IS managers who count on rapid systems upgrades to drive business.

At the Computerworld-Smithsonian Monticello Lectures on May 1, Moore spoke on the past, present and future of the microchip, the electronics industry and Moore's Law. This article is excerpted from his lecture and from an interview with Leadership Series Editor Bruce Rayner.

There is nothing natural about Moore's Law. It emerged from the work of people developing dramatic new technologies, products and processes. And there is nothing sacred about the 18-to-24-month time period between generations of microchips. The relentless pace of chip development has to do with many different factors. Among them: having access to a lot of capital, moving research and development close to the manufacturing process, creating open organizations where innovation can flourish, accepting change as a constant and, of course, having a healthy dose of luck. Indeed, these are the factors that have shaped Silicon Valley over the last four decades.

But there is another, more fundamental driver of Moore's Law, according to the man himself. "More than anything, once something like this gets established, it becomes more or less a self-fulfilling prophecy. The Semiconductor Industry Association puts out the technology road map, which continues this generation [turnover] every three years. Everyone in the industry recognizes that if they don't stay on essentially that curve they will fall behind. So it sort of drives itself. Until we get to the point where, for some reason or another, no matter how hard we try we can't do it anymore."

What will stop the silicon freight train? Moore, who in 1965 first identified the relationship between time and the number of transistors on a microchip, has two fundamental concerns about staying on the curve. First, there are business limitations. As chip densities rise, the cost of production rises almost exponentially. Second, there are real physical limitations. Problems arise as chip design gets down to the atomic level.

Will a new technology, or combination of technologies, provide a solution? Moore doesn't think so. "It is always presumptuous to say 'forever,' but I don't see anything that is going to come along that will replace [microelectronics] technology.

"Maybe I'm just getting old, but my view is that the technology that's developed around silicon was a general-purpose technology for making microstructures of materials. I think it's extremely unlikely that some kind of biological assembly process, to pick an example, is going to be able to make the same kind of products, and therefore, re-

Photo illustration by John Baxter

ally be a substitute technology."

If that's the case, how much longer can the semiconductor industry sustain exponential growth in the complexity of successive generations of integrated circuits?

"I think much of the rate of progress can be expected to continue for at least a few more generations. Three generations of technology at three years per generation is about a decade. So I can see us staying on roughly the same curve that long."

Business limitations

"What concerns me more than approaching physical limits — and there are real physical limits as eventually the atomic nature of matter really starts to bite — is the fact that the cost of the technology seems to be growing exponentially as well. This doubling of the cost about every generation is something that is going to be hard to continue. It will be hard to stay on the same kind of curve that we've been on previously."

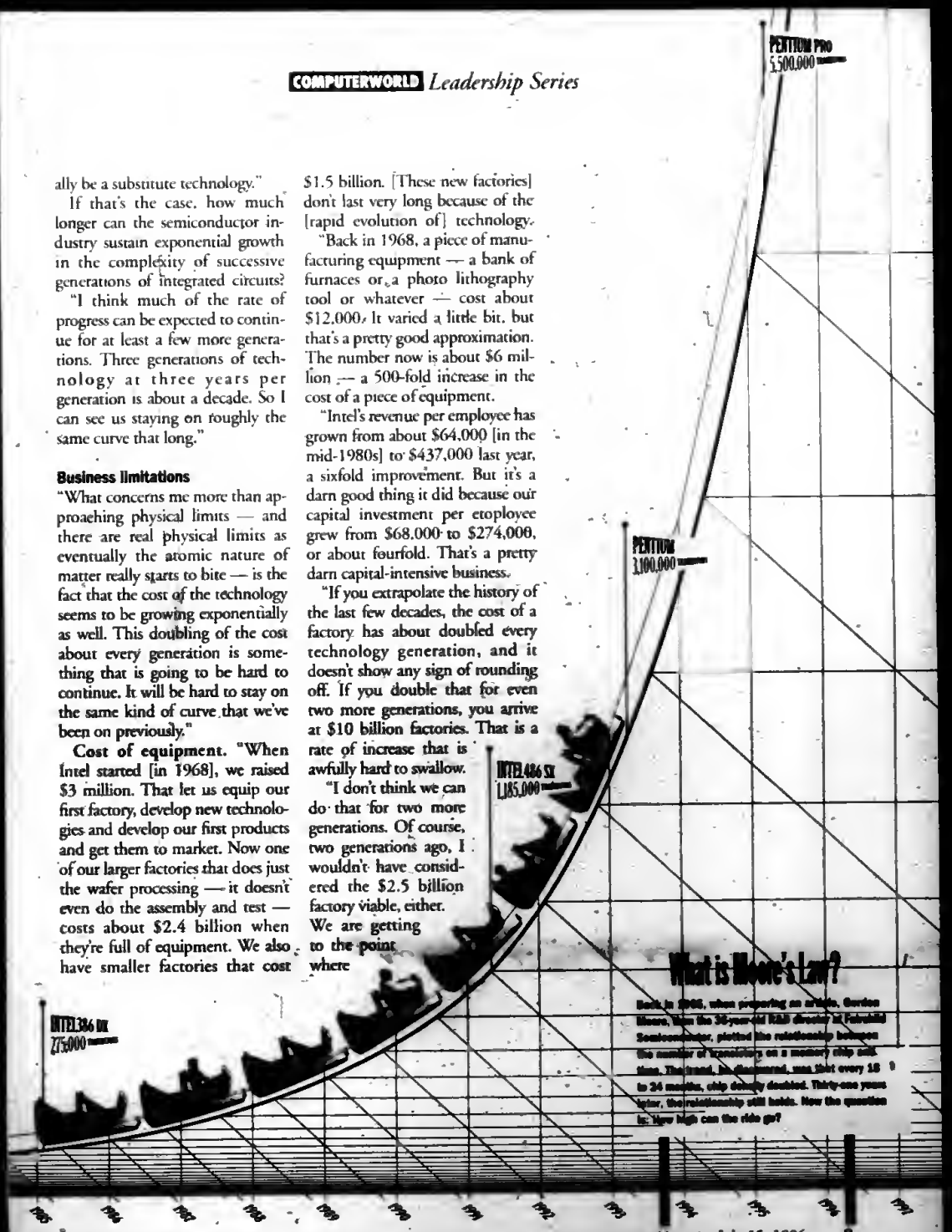
Cost of equipment. "When Intel started [in 1968], we raised $3 million. That let us equip our first factory, develop new technologies and develop our first products and get them to market. Now one of our larger factories that does just the wafer processing — it doesn't even do the assembly and test — costs about $2.4 billion when they're full of equipment. We also have smaller factories that cost $1.5 billion. [These new factories] don't last very long because of the [rapid evolution of] technology.

"Back in 1968, a piece of manufacturing equipment — a bank of furnaces or a photo lithography tool or whatever — cost about $12,000. It varied a little bit, but that's a pretty good approximation. The number now is about $6 million — a 500-fold increase in the cost of a piece of equipment.

"Intel's revenue per employee has grown from about $64,000 [in the mid-1980s] to $437,000 last year, a sixfold improvement. But it's a darn good thing it did because our capital investment per employee grew from $68,000 to $274,000, or about fourfold. That's a pretty darn capital-intensive business.

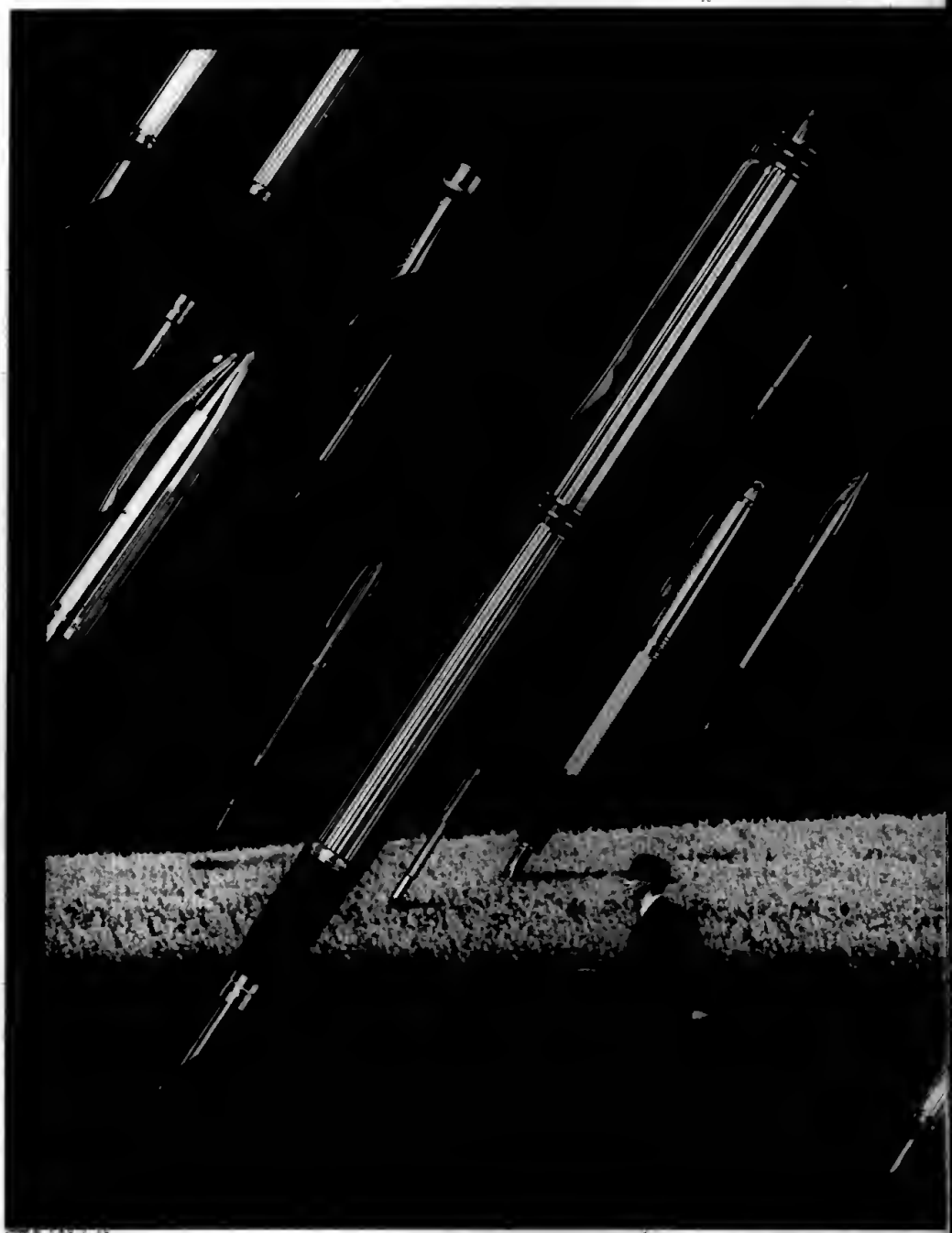
"If you extrapolate the history of the last few decades, the cost of a factory has about doubled every technology generation, and it doesn't show any sign of rounding off. If you double that for even two more generations, you arrive at $10 billion factories. That is a rate of increase that is awfully hard to swallow.

"I don't think we can do that for two more generations. Of course, two generations ago, I wouldn't have considered the $2.5 billion factory viable, either. We are getting to the point where



What is Moore's Law?

Back in 1965, when preparing an article, Gordon Moore, then the 36-year-old R&D director at Fairchild Semiconductor, plotted the relationship between the number of transistors on a memory chip and time. The trend, he discovered, was that every 18 to 24 months, chip density doubled. Thirty-one years later, the relationship still holds. Now the question is: How high can the ride go?



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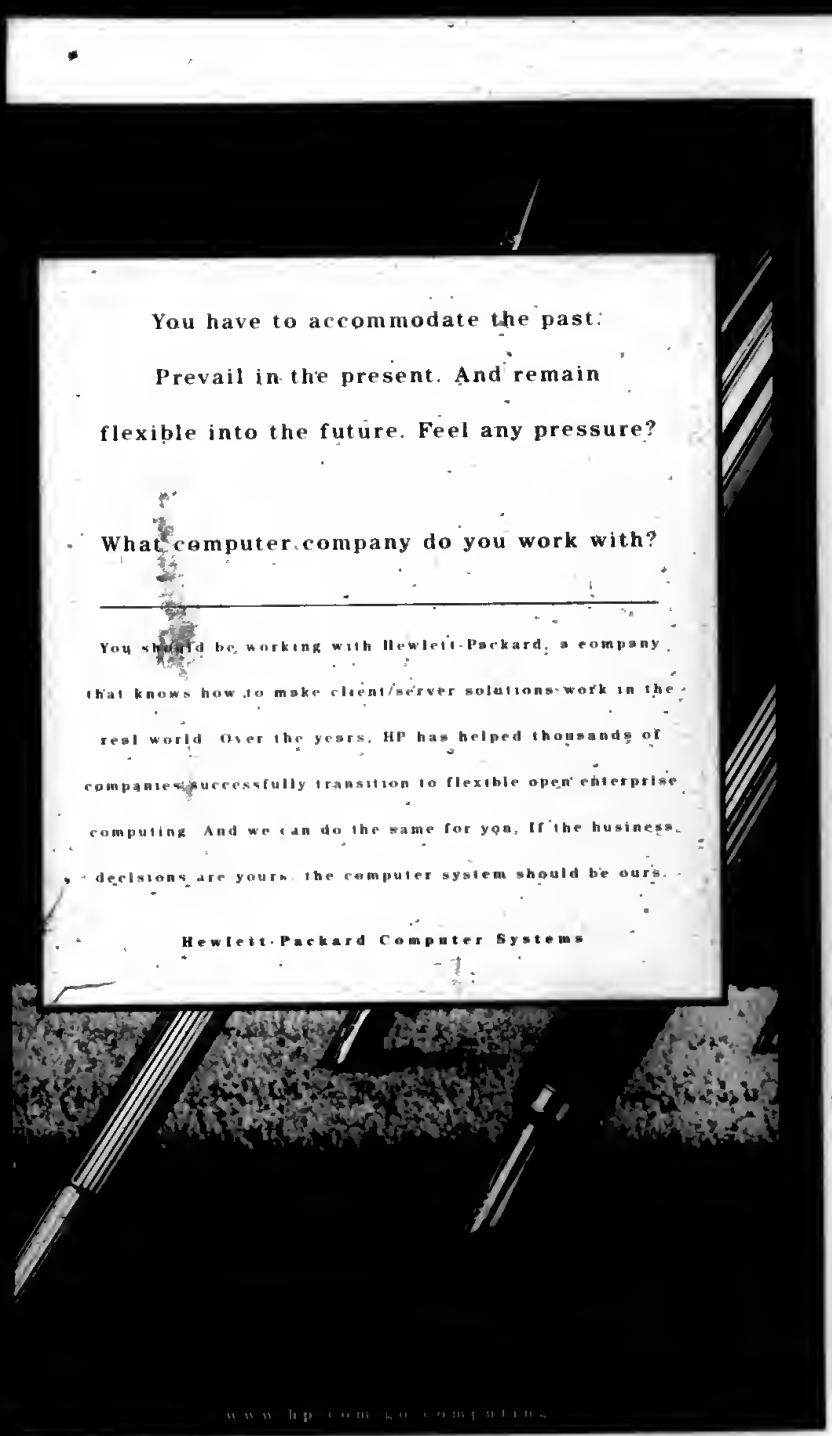

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After sending the first simple integrated circuit into production in 1961, Moore called his lab staff together to discuss what technology they'd tackle next. "We had no appreciation that we had just turned over the first stone in this huge quarry."

the cost of the factory, the depreciation cost and the cost of the investment is an increasingly large fraction of the total cost of building the integrated circuit. It is getting up to the percentage now that it is certainly not clear to me that we can keep doing it.

"A lot of the smaller companies, even some larger companies, are taking advantage of factories built by others. There are factories built in Asia whose charter from the beginning was to supply contract manufacturing.

"But I don't anticipate the major players moving in that direction. You might avoid the capital investment, but there are a lot of disadvantages to depending on other people's capacity. The only way you can be sure you have leading-edge capacity is if you build it yourself."

Cost of labor. "Intel's first microprocessor, [the 4004], which came out in 1971 and had about 2,200 transistors on it, had a gang of about 10 people designing it. Today, the generation we're working on, instead of 2,200 transistors, has about 10 million transistors, or about a 5,000-fold increase in the complexity of the chip if you measure it by the number of transistors. The size of the design team has gone from 10 people to 400 to 500 people, and the costs have gone up at least proportionally. If you plot it, it is pretty near exponential. Unfortunately, I see [this trend] continuing."

Physical limitations

The other major challenge the semiconductor industry faces is the physical dimensions of the chips themselves. As the number of tran-

The $15 million dollar watch

It may be a microprocessor powerhouse, but Intel missed the mark on some key opportunities along the way, admits Moore:

DIG[illegible]CHES. [illegible] tial [illegible] areas [illegible] complex [illegible] volume: [illegible] first one, micro[illegible] being the second one. [illegible]

"and we were also one of the first ones out of the business."

The total investment in Intel's Microma venture? About $15 million, Moore estimates. He still straps on his vintage digital watch every day, keeping it as a reminder that not all business ventures will be as lucrative as microprocessors. "It has an alarm in it that wakes me up every morning."

THE HOME PC. The personal computer "was an opportunity that was presented to me [in the early 1970s], well before Apple [developed its first

Photography by Andy Freeberg

sistors rises, so does the complexity of the design, the size of the transistors, manufacturability and so on.

Transistor dimensions. "It looks like the transistors themselves face some problems with minimum dimensions on the order of 0.05 micron." Right now, the industry is moving toward 0.25 micron technology for mass production.

"If you can operate at increasingly lower voltage levels you'd be OK, but people are concerned with going below something like one volt. I think that practically now, the people in the industry would generally agree that a minimum dimension of around 0.05 microns starts to cause some fundamental problems with devices.

"The [integrated circuit] industry tends to go in steps of about a factor of 0.7. So if we are looking at 0.25 micron as the next generation, then a few years later we'll be at 0.18 micron [approximately 0.25 micron times 0.7]; then a few years after that, 0.13 micron [approximately 0.18 times 0.7]. If you stayed on that path, we've got another two or three generations after 0.13 before we get to 0.05 micron." If each generation takes about three years, then it will be 12 years before the industry faces the 0.05 micron barrier.

X-ray lithography. "Now, there are some intermediate barriers that we have to contend with. One of them is ordinary optical lithography." (Optical lithography is the technology that chip makers use to produce the device pattern on the silicon wafer.)

"Ordinary optical lithography systems can go down to 0.13 micron. But to get below that, you move into X-ray region. X-ray or 'extreme ultraviolet' lithography is a major change for the industry. It will require completely new equipment. So X-ray lithography has got a lot of investment ahead.

"I think to avoid [technical] problems, people will come up with a hybrid approach to lithography, where you only use [X-ray lithography] for the finer structures in a small portion of the device and then [use] regular photo lithography for the rest [of the chip]. I think there's going to be some kind of a discontinuity, though."

What next?

Barring a replacement technology, Moore's Law has until about 2010 before it comes up against a brick wall, Moore says. What then? Will product development begin to slow? Will the cost of successive generations of technology rise instead of fall, as it has over the past three decades?

A lot depends on technology innovations over the next few years. But it wouldn't hurt for business leaders to start thinking about the consequences of the end of Moore's Law. ◆

Gordon E. Moore, *Ph.D., 67, is chairman of the board at Intel Corp. A pioneer in the microelectronics industry and co-founder of Intel in 1968, he received the National Medal of Technology in 1990 from President George Bush.*

[illegible] An Intel engineer came up to me and suggested that we could make a computer for the home using the microprocessors that we were doing then. But the only application he could suggest was the housewife with her recipes.

"I couldn't see my wife sitting at the stove poking numbers into a PC, and so we decided that it's not a product that would ever go anyplace."

DRAMs. "We missed some opportunities by poor activities: The dynamic RAM business, for example, which was the product that really got [Intel] [illegible] Initially, [in the early 1980s], we kind of stumbled on a couple of subsequent [DRAM] generations and lost our leadership position.

"And eventually in the [electronics] industry depression in 1985, where we were positioned again to jump back into a leadership position, we looked at the investment that was required and decided we would have to build a couple of new plants. At that time, [the investment] would have been about $400 million. And since the whole industry was losing money in that business, we didn't see it as a good return.

"So in spite of having done the development of both the technology and the product, we abandoned DRAMs."

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Software

Source: International Data Corp., Framingham, Mass.

Replication heats up

By Dan Richman

Replication, a way to copy data changes among locations, is one hot technology.

Barely on most users' radar screens just two years ago, replication technology is doubling in sales every year and is growing more than twice as fast as the overall market for relational database management systems (see chart). Still, it is a relatively new market, so there are comparatively few customers. But those who have replication in place said they couldn't do without it.

That explosive growth mirrors the increase in the size of databases and the trend to decentralize data among numerous end-user sites, users and analysts said. In the U.S., the average site's data storage capacity is growing by 90% each year, according to International Data Corp. (IDC) in Framingham, Mass.

Replication is "a simple way to spread data around in real time. The biggest growth is in keeping workgroups updated from headquarters," said Steve Hendrick, a research director at IDC.

"We just couldn't survive without replication," said Mike Johnsen, senior database administrator at Access Health, a phone-in health advice service in Rancho Cordova, Calif.

Access Health maintains identical 140G-byte Oracle Corp. databases of 8 million patient records at offices in Phoenix, Chicago and Sacramento, Calif. Every nurse must be able to access each patient's history and know what the last nurse advised the patient.

So Access Health installed Oracle replication technology in April, when it eliminated its Novell, Inc.-based system. That system allowed replication, but it couldn't handle the growing database and failed once or twice a day, Johnsen said.

Convenient backup

Replication is also a convenient way to provide a "hot standby" backup database in case the principal database crashes.

"We use replication to keep in sync our two Oracle 7.2.2 servers, which handle order processing and customer-service records," said Warren Bernard, a senior manager at Network MCI Services Corp. in Richardson, Texas. Calls to 1-800-MUSICNOW, a service that allows the auditing and ordering of music CDs by phone, are answered and serviced by an automated voice-response unit. Orders are fed to an unoccupied server, then replicated to an-

Replication, *page 55*

Project management goes enterprisewide

By Lisa Picarille

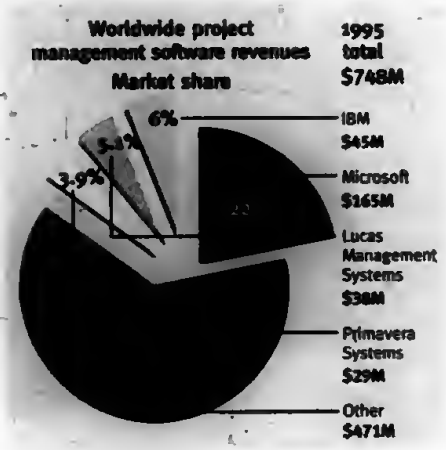
Project management may be a tried-and-true corporate application, but its face is changing. The Internet and other factors are helping project management to link with other kinds of software and broaden its use.

Worldwide sales of project management software are expected to grow 10.6% annually and reach $1.2 billion by 2000, according to Judy Hodges, a senior analyst at International Data Corp., a market research firm in Framingham, Mass. Last year, worldwide sales were $748 million, 70% of which came from the U.S.

"Project management is no longer an isolated application," Hodges said. "Now it can be integrated into other areas of the business — human resources, sales and marketing, accounting." Project managers can see the impact that projects and associated costs will have across the business.

Another factor in project man-

Project management, *page 55*



Source: International Data Corp., Framingham, Mass.

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Users struggle to keep track of Java definitions

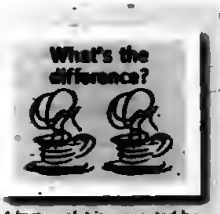
By Frank Hayes

What's in a name? For corporate users of Java, just figuring out why one Java program is called an applet and another is an application can be a head-scratcher.

"I think the difference between an application and an applet is unclear to everybody except people who have started programming in Java," said Larry Hagerty, a Java senior systems analyst at GTE Data Services, a subsidiary of GTE Corp., in Tampa, Fla.

Java is Sun Microsystems, Inc.'s programming language that was designed to let the same program run on many different computers and other devices. Java has been widely touted as a way for large organizations to write applications that run across the Internet or corporate intranets.

But Java can be used in many ways. "People say, 'We're going to do this in Java,'" said John Swartzendruber, an information consultant at Eli Lilly & Co. in Indianapolis. "But sometimes they mean JavaScript, sometimes Java, sometimes applets. Oftentimes I don't think they know what they mean."



A Java applet is prevented by the Web browser from accessing a user's systems resources and files.

A Java application can access files and resources and establish network connections.

To nonprogrammers, Java usually means an applet: a Java program that is downloaded as part of a World Wide Web page and runs within a Java-enabled Web browser. Java's security features block applets from gaining access to users' files or causing other problems.

"The word applet doesn't mean it's a small program," Hagerty said. "We're creating some large-scale Java programs now, but they're applets because they run in a browser."

A Java application is a Java program that runs outside a Web browser and isn't intended to be downloaded on the fly across the Internet. Java applications can access files and make multiple connections to networks — things applets can't do.

JavaScript isn't really Java at all; it is the scripting language used in Netscape Communications Corp.'s Navigator Web browser. And Sun and other vendors are creating extensions to Java called Java Beans, as well as additional Java programming libraries.

Confusion continues

Developers are struggling to keep track of all the new Java extensions and add-ons. But the speed at which vendors are serving up Java guarantees continued confusion among information systems managers and even some developers — at least until they gain more experience with the language.

"It's like you're on a treadmill that's running full bore," Swartzendruber said.

"I think it'll sort out eventually," Hagerty said. "But it's going to be hectic for the summer."

New Products

Magic Software Enterprises, Inc. has announced Magic 7.0, a rapid application development (RAD) system.

According to the Irvine, Calif., company, the product was designed for RAD across the Internet, Windows 95 and Windows NT. It lets users reuse templates, provides rapid feedback and immediate access to tables and application modules, and provides reusable developer and end-user functions.

Magic 7.0 includes enhanced support for the development of multilingual applications, which lets developers build one user interface for all supported languages. It includes a WebLink utility that lets developers create Internet applications.

The product supports Microsoft Corp.'s OLE 2.0. Pricing for a single-user Windows development network system starts at $3,500.

▶ *Magic Software Enterprises*
(714) 250-1718
www.magic-sw.com

Progis Corp. has announced WinMap Software Developers Kit.

According to the Bellingham, Wash., company, WinMap Software Developers Kit lets developers and programmers create geographic viewing and querying systems on a PC without having to learn geographic outline (polygon) coding. It is a database-independent product with display enhancements, including customizable bit maps, icons, menus, fonts and cursor.

The kit includes a Dynamic Data Exchange/OLE-supported database engine for spatial relationships, import tools and features that create base maps from a variety of graphical data sources.

Pricing for WinMap Software Developers Kit starts at $5,000.

▶ *Progis*
(360) 738-2449
www.progis.com

Softmap Future Design, Inc. has unveiled Quovis Standard.

According to the San Bruno, Calif., company, Quovis Standard lets developers of visually demanding applications integrate many data types with one another and with existing applications. The result is spatially enhanced applications with dynamic, customizable interfaces.

Quovis Standard supports vector and raster graphics, video, sound and text. It features scrolling capabilities that let users navigate visual images without having to use scroll bars or wait for redrawn screens.

Quovis Standard costs $995.

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New dimensions

Most observers agree that project management will take on new dimensions over the Internet — and vendors are working to change their software to allow that.

Primavera Systems, Inc. in Bala Cynwyd, Pa., is streamlining the process of posting project management data on intranets by creating project management templates that are already in Hypertext Markup Language format, company officials said. The company is also developing Java applets that will automatically send data and information to those involved in projects. But the officials wouldn't specify when this will happen.

For its part, Time Line Solutions Corp. in Bellevue, Wash., plans by this month to have a Java-based intranet client that will act as a front end to its project manager.

Customizing projects

Microsoft Corp. is taking a different tack by providing tools that let users extend and customize their project management package. Jean Cho, group project manager for Microsoft Project, said workgroups can be more closely tied in to project management by better integrating Project with Microsoft Office.

For example, users can extend Project's capabilities via integration technologies, including OLE, ActiveX controls, Visual Basic for Applications and Microsoft's BackOffice, Cho said.

Project management

CONTINUED FROM PAGE 51

agement's popularity is the increase of PC-based packages. Traditional users have been mainframe-based aerospace engineers and others who have had project management as part of their titles.

Now, project management is considered easy to use and able to provide the depth of features previously found only in mainframe software, said Chris Le Tocq, an analyst at Dataquest, a market researcher in San Jose, Calif.

"The typical user is someone like a marketing manager who has several things to oversee at once," said Mike Webb, president and CEO of Time Line Solutions Corp., previously part of Symantec Corp. and a project management vendor.

Some project management packages are moving from tracking individual tasks to looking at an entire project's scope and determining what kinds of resources it will require.

This makes it even easier to do enterprisewide project management. "I have to be able to look across 60 to 80 projects simultaneously and know what my capacity is to take on other projects," said Paul Micci, scheduling administrator at Air Products & Chemicals, Inc. in Allentown, Pa.

Internet differences

Another big change has been the Internet. Time Warner Cable Full Service Network, a division of Time Warner, Inc. in Orlando, Fla., is implementing an intranet to help manage a 15- to 20-year project that will put interactive television into homes.

"We will have the knowledge at our fingertips to automatically transfer resources between projects," said Dan Rexroad, manager of process and method at Time Warner Cable. Because the information is posted on the intranet, the 50 people involved in the projects can see what resources are available and what is going on, he said.

Most analysts agreed that the Internet will foster even greater use of project management but said software will have to change to accommodate it (see story at left). "Better integration of calendaring and scheduling systems that automatically update project plans are a natural extension, particularly down the road," Le Tocq said.

He said he envisions companies using intranets for better project management with their customers — lawyers making their appointment books available to key corporate clients, for example.

Replication

CONTINUED FROM PAGE 51

other within 10 sec.

"If one goes down, replication technology keeps checking whether it's back up," Bernard said. "If it is, it gets automatically updated. Without this, it would be a very large pain in the neck to do business — or I couldn't do it at all."

The major RDBMS vendors offer replication. But there are differences among the offerings to ask about:

- **Type of replication offered.** Some vendors provide update-anywhere replication. This lets any copy of the database be updated and sends changes to all other copies. It creates the potential for conflicting changes, which can be dealt with by a feature called automatic conflict resolution.
- **Data cleaning.** IBM claims this summarizes, translates or otherwise modifies data while replicating it.
- **Where the replication code resides.** Informix Corp. integrates replication code into the kernel because it claims that cuts I/O overhead. Others maintain separate engines on the grounds that they are more flexible.
- **Heterogeneity.** The ability to replicate data among two or more dissimilar DBMSs. Vendors' capabilities and pricing vary.

Glossary

- **Replication:** The periodic copying of changes in data, often involving multiple tables, to one or more remote databases.
- **Primary-Site Replication:** Only one database is updated; changes are sent to one or more remote copies of the database.
- **Failover Replication:** A type of Primary-Site Replication in which a single remote copy of the database is used only as an emergency backup.
- **Update Anywhere:** Any database can be updated; changes are sent to all other copies of the database. Potential exists for conflicting changes.

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Moving beyond the help desk

By Bob Francis

The corporate help desk is getting some company.

New software links the help desk to systems management tools and the Internet, bringing some new functionality beyond just telephone-line support.

These links are meant to give systems and network managers better information on how their systems are operating and give help desk managers recent data on new systems and applications

"Most help desk systems operated separately from system management functions in the past," said Jack Gold, an analyst at Meta Group, Inc. in Boston. "In many cases, they were duplicating efforts."

For instance, when a company downloads software from a server to a PC, the information is available in the LAN management tool but often isn't available to help desk workers because the two databases aren't linked. Many of the latest releases of help desk software link the two databases.

Two systems management companies adding these links are McAfee Associates, Inc. and Platinum Technology, Inc.

Help over the 'net

Vendors are adding Internet capabilities to help desks

Company	Product	Function
McAfee Associates	Vycor Web	Web gateway to Vycor Enterprise database
Platinum Technology	Apriori Hands-Free Support	Help desk support through the Internet

Platinum Technology, in Oakbrook Terrace, Ill., has added support for Hewlett-Packard Co.'s IT/Operations management framework to its Apriori help desk tool. IT/Operations managers can send and receive messages and alerts to and from Apriori and can pass information among Apriori and other Platinum Technology systems management tools.

McAfee, in Santa Clara, Calif., purchased Vycor Corp. in College Park, Md., earlier this year. McAfee has integrated Vycor's help desk functions into its asset management products and its Saber LAN Workstation network management suite.

More capabilities

Integration with Vycor's products gives help desk workers access to Saber's distribution, metering and inventory functions.

"This way, we know — often up to the minute — what applications should be available on a user's desktop, so we're working with better information," said Robert Spears, help desk manager at Bank of Boston.

The two products also support Internet access to help desk databases. McAfee has added Vycor Web, a system based on Microsoft Corp. Windows NT Server that gives users access to the Vycor information database and to trouble tickets. Apriori also supports Internet access to its database.

McAfee's Vycor Enterprise 3.1 is available now and costs $15,000 for 10 help desk operators. Platinum Technology's Apriori costs $37,500 for 10 users and is available now.

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The LAN, WAN monitoring frontier, 63

The Enterprise Network

Transmission technology revived for 'net

By Kim Girard

Asynchronous Digital Subscriber Line (ADSL) technology, once touted for video applications, is bouncing back as a powerful way for users to access the Internet.

Five years ago, the regional Bell operating companies were looking at ADSL, which offers broadband services over copper local loops, for video on demand and other video-based services. But industry attention soon shifted to cable modems and fiber technology.

Today, the increasing number of remote users are demanding faster access to the Internet. This demand is reviving ADSL.

The players

BellSouth Telecommunications, Inc. in Atlanta plans to offer ADSL services by the middle of next year. AT&T Paradyne recently unveiled Rate ADSL, which lets carriers provide various transmission rates. Some other big players, including Alcatel Telecom, Cisco Systems, Inc., General DataComm, Inc. and NEC Corp., demonstrated ADSL products at SuperComm, a telecommunications show in Dallas last month.

"We're waiting for the price to settle down."

— Mike Randolph, Community Service Communications

"The resurgence is due in part — if not entirely — to everyone seeing Internet dollars," said Beth Gage, a broadband consultant at TeleChoice, Inc. in Verona, N.J.

ADSL provides up to a 6M bit/sec. link to the user and a 640K bit/sec. link back to the carrier, offering a speedy solution for the last mile that is much cheaper than fiber. High-speed Digital Subscriber Line — another member of the DSL family — supports bi-directional 2M bit/sec. links.

"We think [ADSL] has potential," said Mike Randolph, plant manager at Community Service Communications, a local cable-access provider in central Maine. "We're waiting for standards. We're waiting for the price to settle down."

By the end of next year, the price for an ADSL modem should drop from the $2,000 to $3,000 range to $250 to $500, said Steve Sazegari, a principal at Tele Mac in Foster City, Calif. In the long run, ADSL is an interim solution that fiber will replace, he said.

But it is a smart bet in the short term, said David Sobin, communication systems group vice president at Ariel Corp. in Cranbury, N.J.

"Copper works fine, and it's there," he said. "Why run fiber out to those neighborhoods for hundreds of millions [of dollars]?"

NetWhere?

New NDS version tracks better

By Laura DiDio

When Novell, Inc.'s NetWare 4.11 ships later this summer, it will contain a slew of enhancements that will make its directory database much easier to use and manage.

The newest version of Novell Directory Services (NDS), code-named Green River, will contain a graphical management utility called NDS Manager that makes it simpler for administrators to monitor and track users, objects and resources across the enterprise and to quickly troubleshoot problems, said William Donahoo, Novell's senior director of product marketing. Another tool, the User Template Object, will let network managers set customized defaults and parameters as users and devices are added to the network, Donahoo said.

Early beta users of the new NDS features, such as Dan Blevins, technical analyst for microsystems and LANs at Hallmark Cards, Inc. in Kansas City, Mo., said the improvements to NDS are big money savers. Hallmark has 54 NetWare 4.1 network servers and 7,000 clients. About 80% are located at the firm's Kansas City headquarters; the rest are scattered throughout the U.S.

NDS in the current NetWare 4.1 version requires Hallmark to deploy several utilities, including DS Trace and DS Repair, to track and solve problems, Blevins said. "It now takes two network administrators about 30 minutes, on average, to troubleshoot and fix problems. However, the NDS Manager tool in our Green River pilot networks lets us devote a single administrator to monitor the network, and problem reso-

NetWhere, *page 62*

Market Management's Patrick Brennen, NDS [illegible] and users "[illegible] and a feeling of [illegible]"

Fiber users eye FDDI switching

By Bob Wallace

The problem: Many users with FDDI backbone networks are running out of bandwidth but aren't yet comfortable with ATM technology.

The solution: Migrate to FDDI switching, which is offered by the major vendors and doesn't require painful upgrades or retraining.

That's the path many users with Fiber Distributed Data Interface (FDDI) backbones are taking to boost performance and squeeze a few more years out of their networks while they wait for faster Asynchronous Transfer Mode (ATM) technology to mature.

Worldwide sales of FDDI switches totaled $212.5 million last year and will rise sharply this year to $365.85 million, according to Dataquest, a research firm in San Jose, Calif. Sales will then gradually decline to $309.8 million next year and $227.7 million in 1998 as ATM is more widely deployed and Gigabit Ethernet emerges, a Dataquest study predicts.

"Users [who] moved to FDDI in the early 1990s did so because they were the first to experience congestion in their backbone networks," explained Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "It was the first and fastest response at the time. Now they're looking to switching to stay ahead of congestion."

That was the case with Air Products and Chemicals, Inc.

FDDI, *page 62*

Migrating to switching

Options for users with 100M bit/sec. FDDI backbone networks

Technology	Pros	Cons
ATM	• 155M bit/sec. and faster	• Immature technology • Expensive
Gigabit Ethernet	• 1G bit/sec. • Based on original Ethernet	• Products not available • Pricing not set • Not a standard
FDDI switching	• 100M bit/sec. • No painful upgrade • Offered by all major vendors • Moderate price	• Doesn't offer speeds as high as ATM

NetWhere? New NDS tracks better

CONTINUED FROM PAGE 61

lution time has been reduced to five to 10 minutes," he said.

NDS is considered the guiding light of NetWare 4.11 because it gives businesses a graphical picture of the entire enterprise and lets them centrally make moves, adds and changes to remote and local NetWare LANs.

Until now, many NetWare shops delayed implementing some of the more advanced features of NDS because the directory database was so technologically daunting, said Patrick Brennen, network operations manager at Mercer Management Consulting, Inc. in Boston. "To really get the most out of the earlier versions, such as NetWare 4.0, you had to be a Certified NetWare Engineer," Brennen said.

Overall, he said, Mercer Management's end users like NDS' ability to access other network resources regardless of where they are located. "It gives them flexibility and a feeling of teamwork," he said.

Jon Oltsik, an analyst at Forrester Research, Inc. in Camhridge, Mass., said the improvements in NDS and the new features in Green River, including symmetrical multiprocessing and automated crash recovery for NetWare file servers, add much-needed functionality to NetWare. "Novell has given NetWare a body job and a new coat of wax. The new features, combined with the much improved ease of use, will make businesses think twice about abandoning NetWare for a wholesale migration to NT Server," Oltsik said.

FDDI switching

CONTINUED FROM PAGE 61

"We started with FDDI five years ago and found it to be a very solid technology and the only answer to our congestion problem," said Virgil Palmer, manager of computing and telecommunications infrastructure engineering at the manufacturer of specialty chemicals and industrial gases in Allentown, Pa. "But we found we needed more capacity on our backbone network, so we installed an FDDI switch to support our 8,000-node network."

FDDI switching lets users such as Palmer break up their shared 100M bit/sec. FDDI networks into smaller subnets with dedicated bandwidth. Air Products went from one large FDDI ring to 32 smaller rings.

Bandwidth boosts

Vendors recognized this user trend. 3Com Corp., Cabletron Systems, Inc., Cisco Systems, Inc. and several smaller players, including Xylan Corp., all rolled out FDDI switching in their data center switches during the past year.

Fast, but slow to catch on

Analysts expected ATM, which offers speeds of 155M bit/sec. and faster, to be the next step for FDDI users. But the technology has been slow to catch on due to its high cost and slowly developing standards.

"We just weren't ready to commit to ATM," Palmer said. "This move doesn't preclude us from ATM, hut we'd rather have someone else get burned on a new technology."

R. R. Donnelley & Sons Co. is another large user considering FDDI switching as an interim step.

"FDDI technology on the whole is smoother and more mature than ATM and offers us the network redundancy that we've had to have," said Bill Rocholl, senior network engineer at the printed and digital information distributor in Chicago.

But not all FDDI users are moving to FDDI switching right now.

"FDDI is a real workhorse technology, which is crucial when the network is supporting clinical applications," said Jack Frost, network manager at Texas Children's Hospital in Houston. He said the hospital isn't moving to FDDI switching yet because the network isn't congested.

Frost originally went with FDDI because bandwidth-intensive applications were stressing the hospital's Ethernet and router network.

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The LAN, WAN monitoring frontier

By Patrick Dryden

The management of complex client/server networks should get easier this month for users of Remote Monitoring (Rmon) probes and analysis software from Frontier Software Development, Inc.

An upgrade to Netscout Manager performance monitoring software helps administrators watch traffic through switches on campus and frame-relay links across a wide-area network. New trend reporting tools enable long-term evaluation of network performance.

And the multiport WAN probe can cut the cost and boost the efficiency of watching multiple WAN circuits, users and analysts said.

Such improvements to the Netscout line target users such as Stephen Stought, a network specialist at Nationwide Mutual Insurance, Inc. in Columbus, Ohio.

"We need Netscout to figure out problems like slow response by a critical application for investing through stock purchase. When the price jumps before our purchase goes through, a few minutes' delay can cost us thousands of dollars," Stought said.

Nationwide made bandwidth upgrades to its network by segmenting, adding switches and building a faster backbone. But that didn't solve the problem.

"We did a good job of network overkill to remove [bandwidth limits] from the equation, yet utilization remains low," Stought said. "To avoid costly mistakes in the future, we need to look at other aspects of the transaction instead of reacting without full analysis."

Price check

Frontier Software's Netscout Manager 4.1, available now, costs $3,495 for a Windows console and $5,995 for Unix. The new probe ships at the end of the month at a cost of $11,945 with four T1 interfaces; by comparison, a probe for one WAN link costs $4,995, and full probes cost $19,980.

Changes in Netscout Manager 4.1 extend its monitoring capability by treating each port on a switch and each frame-relay virtual circuit like normal network segments, said officials at Frontier Software in Chelmsford, Mass.

"Frontier Software goes directly in the frame-relay parameters, so the user can really see if he's provisioning circuits appropriately and getting the committed information rates he paid for," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo. "No other vendors do this yet."

One Netscout user has been eager to get such support for monitoring switches from Cisco Systems, Inc.

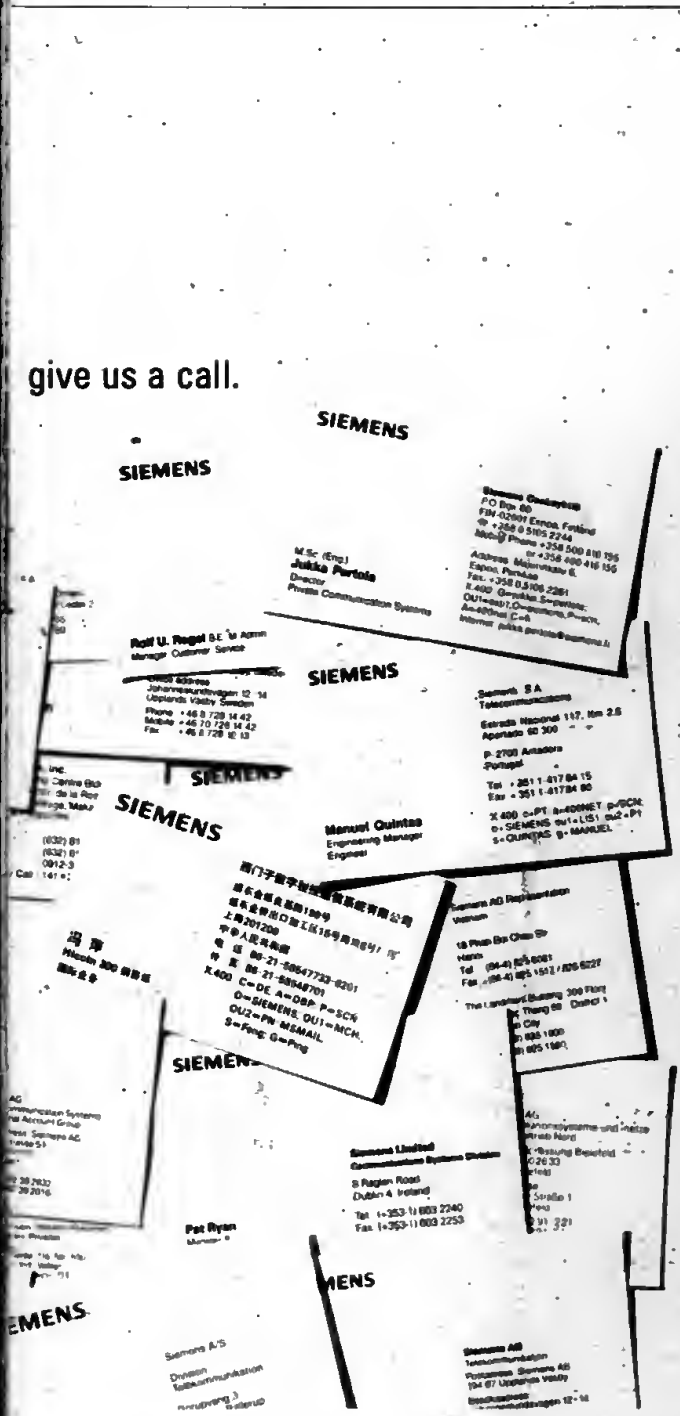
Bob Childress, network management analyst at Texas Instruments, Inc. in Dallas, said, "We can see [a Fiber Distributed Data Interface] backbone, but we can't really monitor individual switch ports. Now we'll be able to bring up a view of all ports to check utilization and errors."

For WAN monitoring, the Netscout Model 7500 Enterprise Probe can watch four links without affecting performance by tapping in to the routers or data service units.

Childress said he wants to test the multiport WAN probe on the network operations that link TI sites worldwide.

"This probe should save overhead and will let us look at both sides of a circuit coming in from Europe and passing through to Japan," he said.

Other vendors offer multiport Rmon probes to improve the economy of network monitoring, but those focus on LAN traffic, not WANs, McConnell said.



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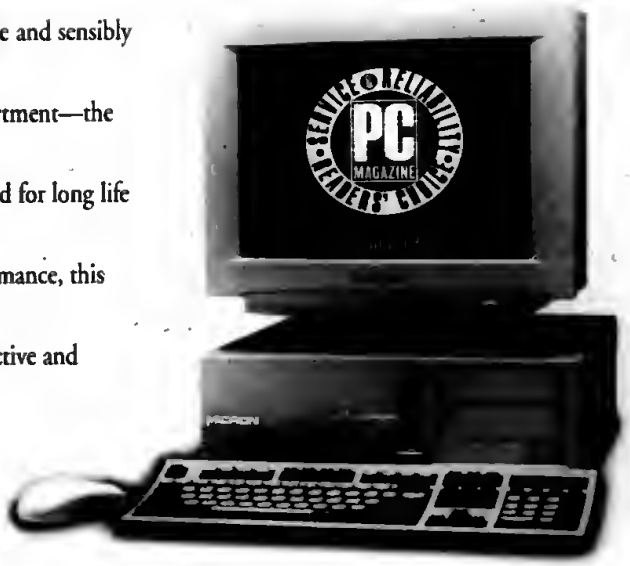

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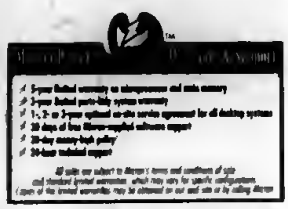

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Online survey details how end users use the Internet, 69

The Internet

Closer Look
Intranets

Learn your lessons well

By Kim S. Nash

As intranet pioneers stake their claims and start building, they are generating a body of frontier lore from which other information systems groups can learn.

For example, Centura Banks, Inc. in Rocky Mount, N.C., found a way around a lack of funding.

It piggybacked supplies for its intranet — software, hardware and tools — on an external Internet banking project. Upper management already had put a high priority on the project.

The following are other ideas from those who have been there.

Security

Chrysler Corp.'s solution to what officials considered ineffective security methods was to leave some sensitive data out of an intranet application for car designers.

The system was built to help Chrysler engineers design better cars that cost less than the competition by estimating how much money Ford Motor Co. and other rivals spend on particular auto parts. But what isn't in the database is data about Chrysler's own spending.

"The last thing I want is that getting into competitors' hands," said Susan Unger, executive director of information systems at Chrysler in Center Line, Mich. "We have firewalls, but [our intranets] are not as secure as I would like."

Other users, such as Imperial Oil Ltd. in Calgary, Alberta, said intranets for accounting or strategic planning may require IS to double or triple the number of security measures that are used in other applications.

Culture

When Carole Franda faced the monotonous task of amending her company's corporate software development policy handbook for the fourth time this year, she broached the intranet idea with her boss. Such a "living document" would save time and money, said Franda, a webmaster at Bell Atlantic Corp.'s Broadband Systems unit in Silver Spring, Md.

But her boss saw it differently. He approved her plan but requested that she produce the 100 hard-copy binders "just in case."

"The only way I could convince him that it really would work was to just go ahead and build the thing and sit him down in front of it," Franda said.

Other users tell similar tales.

William Monroe, a webmaster at Harris Corp., an electronics company located in Melbourne, Fla., couldn't get the attention of his vice president. But then Monroe decided to build a mini-intranet that included the executive's picture and memos he had written. The stunt saved Monroe's intranet project.

> "[Our intranets] are not as secure as I would like."
>
> **Susan Unger, Chrysler**

Living with Notes

The Lotus Notes vs. intranet debate divides many shops. Some have opted for one over the other. Most shops say the two technologies can live together in peace. But it isn't easy.

Access Health, Inc. carefully considers when to use Notes and when to go for an intranet.

But unclear boundaries are "a major concern," said John Determan, a technical analyst at the health care information company in Rancho Cordova, Calif.

Application developers at Access Health use Notes to track projects and share documents. "They don't necessarily want to give it up," he said.

But now, IS is stricter about cost-justifying Notes, Determan said.

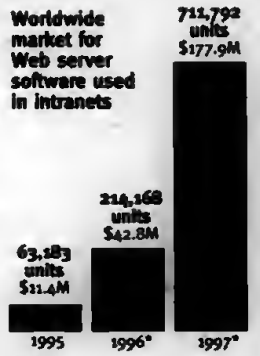
For other users, intranets are a welcome alternative to Notes.

Environment Canada, the environmental affairs division of the Canadian government, wanted to use Notes last year but couldn't because the cost of migrating corporate data from legacy systems to a Notes-ready format was too high.

But the Ottawa-based agency now is building an intranet for a natural resource engineering application, said Mike Reichling, a systems analyst at Environment Canada.

"Anyone with a Web browser can look at the data, no matter what platform is involved," Reichling said. Using Notes instead of an intranet would have required outfitting all users with the software, he said.

Worldwide market for Web server software used in intranets



*Projected
Source: International Data Corp., Framingham, Mass.

Skills

Finding IS folks who can do the intranet job also can be a chore.

Retraining employees is your best bet, many users said. Those workers already know the technical and political systems at the company.

But sometimes intranet plans move faster than training programs.

Cheap labor

In that case, hire college kids or fresh graduates, advised the Texas Comptroller of Public Accounts, a state agency in Austin. "Our experience has been that most consulting firms don't have the skills. Your best source is kids — and you can hire them dirt cheap," said Stuart Greenfield, an analyst at the agency.

Words of wisdom

Advice from consultants who have helped users design and build intranet applications

STARTING OUT | POLITICS | NOTES VS. 'NETS | STOP | HOME

On starting out

A human resources system is a good intranet starting point, according to Harry Fenik, an analyst at Zona Research, Inc. in Redwood City, Calif.

Those programs are usually isolated from core business systems. Should something go wrong, no major catastrophes loom, Fenik said.

On politics

Intranet "ownership" is a big mess for some companies that have seen departments duel over access to information.

To avoid some of the hassle, put intranet access points in public places throughout the company, advised Leilani Allen, a consultant at Tenex Consulting, Inc. in Burlington, Mass.

Leilani Allen

On juggling Notes and intranets

Don't automatically rule out Lotus Notes groupware in favor of intranet systems or vice versa, said Don Ryan, an analyst at Meta Group, Inc. in Stamford, Conn.

Intranets could take over some tasks, such as acting as corporate phone books, but Notes might be better for more complex applications, he said.

– *Kim S. Nash*

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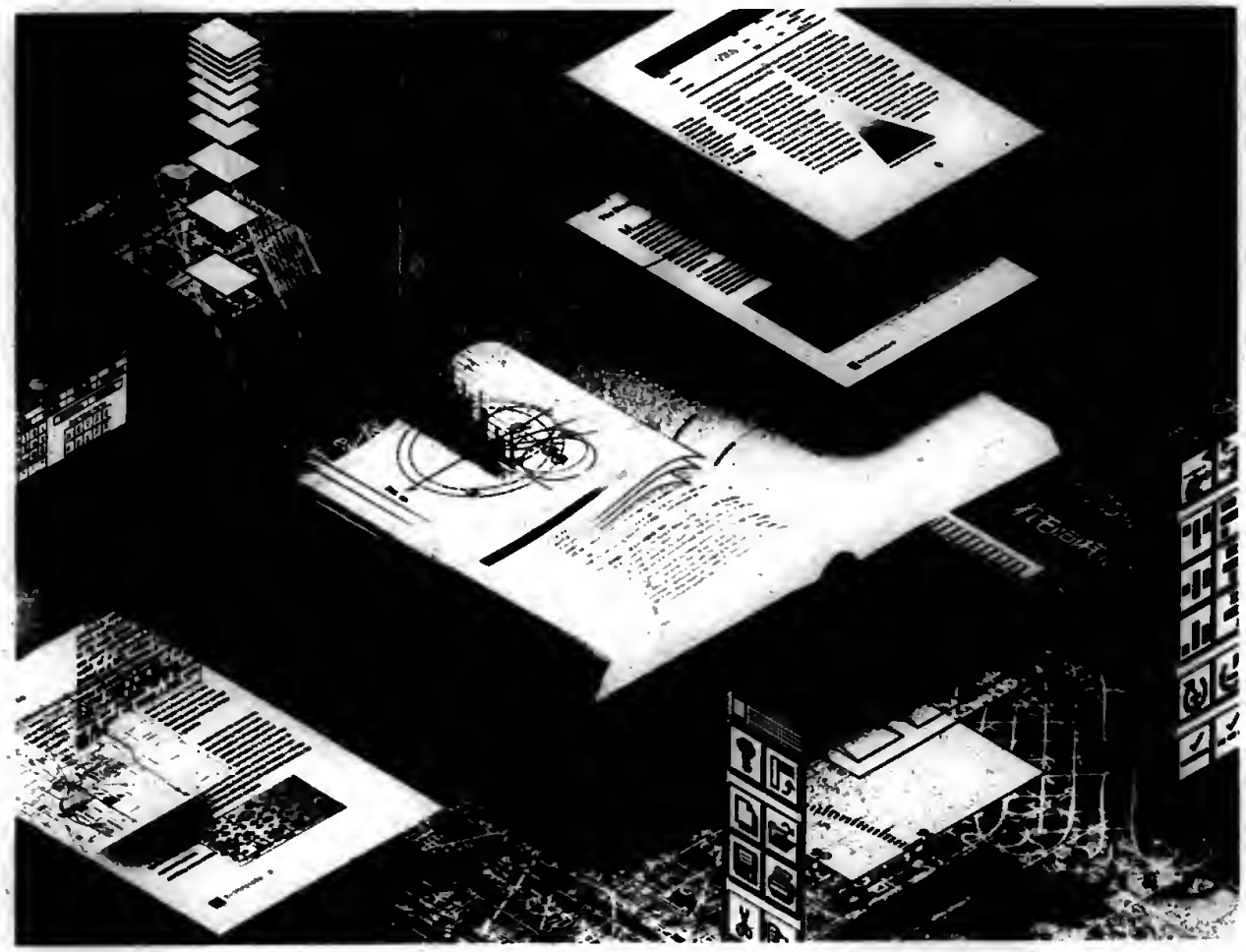

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Mapping software heads in new direction

By Mitch Wagner

New Internet services are designed to help companies draw online maps to their business sites, using interactive technology to generate foot traffic in the real world.

Vicinity Corp. in Sunnyvale, Calif., today plans to launch a service that will let companies put customized street maps on their World Wide Web sites.

The Vicinity service competes with similar technology from GeoSystems Global Corp. in Lancaster, Pa.

For example, *Playbill Magazine* uses the GeoSystems service at its Web site (www.playbill.com) to draw maps of 1,500 theater locations nationwide.

Retail chain The Sharper Image uses the GeoSystems service to point out the location of each of its stores on maps at its Web site (www.sharperimage.com).

And Yahoo, Inc. uses the Vicinity service to build an online Yellow Pages of the San Francisco Bay area (sfbay.yahoo.com).

Yahoo has built *an online Yellow Pages of the San Francisco Bay area. The company uses interactive technology from Vicinity*

"All of our venues in the continental U.S. are mapped out through GeoSystems," said Andrew McGibbon, webmaster at *Playbill*. "A user can go in to [the *Playbill* site] and find out what's playing at a particular theater, go to a local map, find out where the theater is, and zoom in and out to find out what businesses are nearby," he said.

Each service lets end users log in to a corporate Web site where, for example, they can search for a map that shows the location of a particular store.

The corporate Web server passes the inquiry to a Vicinity or GeoSystems server, which builds a map of the location and passes it back to the end user.

Maps are mixed together with graphics from the subscribing company, making the map appear to have been generated on the subscribing company's Web site.

The GeoSystems service costs $6,000 to $20,000 per year, depending on the level of traffic. Vicinity wouldn't comment on the cost of its service.

Well-received

"We get a lot of positive response from it," said Karl Sowa, a spokesman at GeoCities, a Web-hosting service in Beverly Hills, Calif. GeoCities offers the Vicinity technology as a feature for its service hosting personal home pages. "We get dozens of [electronic mail messages] a day from people saying how much they like it."

The Vicinity service, YourTown, is available immediately for maps of the continental U.S. Vicinity next month plans to unveil "proximity searching" to help end users find relative distances between given points, such as finding the nearest automatic teller machine to a given point.

GeoSystems offers three levels of Internet service. MapQuest Custom Connect, available since late last month, is similar to YourTown because it allows subscribers to build "private label" maps on the Internet through a connection between the subscriber's Web site and MapQuest's site. That service is priced on a per-hit basis, typically $6,000 to $10,000 per year.

Find it quick

Vicinity and GeoSystems have databases that provide the locations of more than 12 million businesses nationwide.

Another service, MapQuest Free Connect, also unveiled late last month, allows Web publishers to put forms on their Web sites and submit queries to MapQuest. They can submit up to five queries at a time for free.

A third service, MapQuest Interconnect, lets Web publishers link their site to the MapQuest site. When end users submit an inquiry, they are taken to the MapQuest site to view a map.

The cost of Interconnect is about $12,000 to $20,000 per year.

Briefs

Webmaster CNE?

Novell, Inc. has developed a certification program for Internet managers and webmasters that covers testing in Hypertext Markup Language skills and World Wide Web management. Netscape Communications Corp. will work with Novell to create material. See education.novell.com for details.

AOL sends Shockwave

America Online, Inc. has signed a pact to distribute Macromedia, Inc.'s Shockwave to its subscribers. This follows Macromedia's announced partnership with Microsoft Corp. to integrate Shockwave with ActiveX technologies and Microsoft's Internet Explorer 3.0.

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Turning to a new page

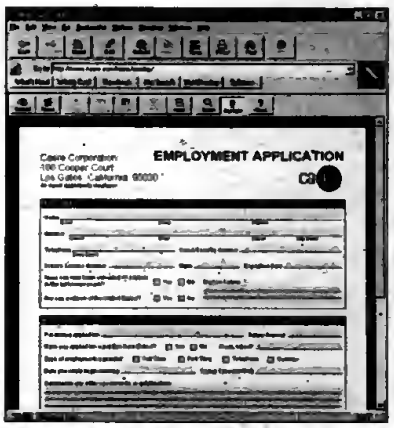
Tool links forms, Web sites

By April Jacobs

Caere Corp. wants to write a new page in the $3 billion electronic forms and documents market with Internet publishing software that integrates paper forms with World Wide Web sites.

Caere in Los Gatos, Calif., plans to introduce a beta version of its OmniForm Internet Publisher later this month.

The product is aimed at government, health care and insurance industries, where customer interaction and paper flow are intensive. Other products, such as Xerox Corp.'s Textbridge, let users scan in documents and convert them to Hypertext Markup Language (HTML) documents



Caere's OmniForm Internet Publisher *lets users integrate paper forms with Web sites*

Improved format

Caere's product uses its own Open Form Markup language, which is comparable to HTML but allows richer graphics and layout, said Tom Koulopoulos, president of Delphi Consulting Group, Inc. in Boston.

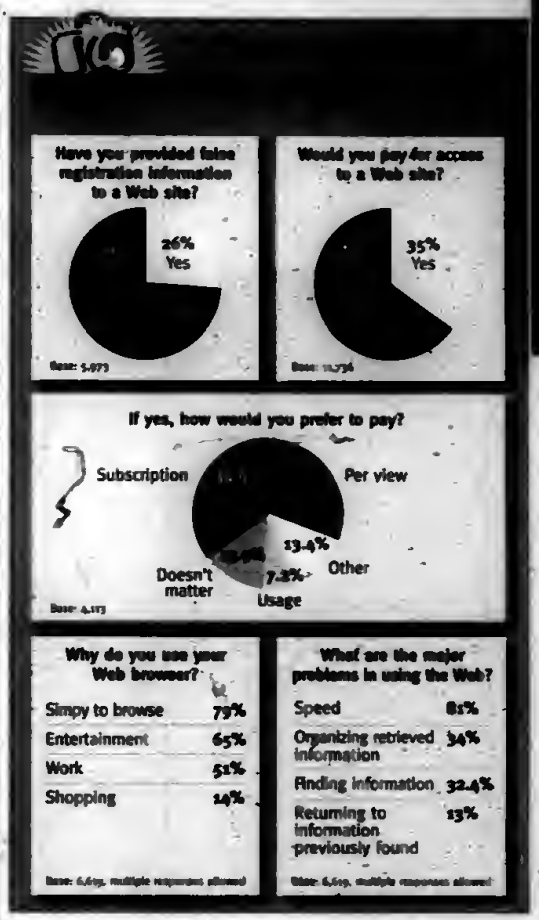
Beta-tester John Kelly, manager of the Electronic Storage Division at Kelly Computer Systems in Mountain View, Calif., said OmniForm can be used with electronic commerce and human resources, among other things. Kelly Computer provides systems integration and forms design. "This Internet publisher is going to function quite well in that environment," Kelly said.

Also, a company could develop a page to let users order a product and use the same form to fill the order and ship it. The Caere product brings a wider range to the market, he said. "You can take forms you're using already and bring that form into play with very little modification," he said.

Clay Ryder, a senior industry analyst at Zona Research, Inc. in Redwood City, Calif., said Caere's challenge will be to educate the market it is courting. "I just don't think we're at the point where we've established the market yet, but I do think there's a potential for it," he said.

Paper-intensive businesses may be the first to bite, he said. "If you were in an industry like health care or insurance or the government, this is a reasonably good substitute for a paper form," he said.

Scott McCready, a principal at International Data Corp. in Framingham, Mass., said electronic forms can be valuable, but the forms alone may not solve an organization's problems. "This stuff is great for a really simple form," he said, but the back-end processes also must be in place. OmniForm Internet Publisher for Windows 95, NT and 3.1 will cost $695; the data collector will cost $299.



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New Products

WebVision, Inc. has introduced Webtropolis OrderNet 2.0, an interactive order management system.

According to the Torrance, Calif., company, Webtropolis OrderNet 2.0 lets a business of any size create a virtual store at a new or existing World Wide Web site.

It then lets users adjust prices, display color images of inventory and accept payments.

Webtropolis OrderNet 2.0 features customizable templates, scripting tools for Hypertext Markup Language and an order management module. It also includes a database gateway that supports databases, including Oracle Corp.'s SQLServer and Sybase, Inc.'s and Microsoft Corp.'s SQL Server.

Pricing for Webtropolis OrderNet 2.0 starts at $2,995.

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Micrografx, Inc. has introduced ABC QuickSilver Pack, a graphics tool for creating Internet and intranet pages.

According to the Richardson, Texas, company, ABC QuickSilver Pack works with the company's ABC Graphics Suite to let users create World Wide Web pages with interactive graphical elements.

ABC QuickSilver Pack can be downloaded for free from the company's home page.

▶ *Micrografx*
(214) 234-1769
www.micrografx

Comsortium LLC has announced WebRecruiter 2.0, an intelligent World Wide Web agent.

According to the New York company, WebRecruiter 2.0 is a recruitment and human resources tool that combines Java application development methods with Oracle Corp.'s PL/SQL language. It creates user profiles for online job seekers and was designed to match their skills with job requirements specified by human resources managers. WebRecruiter is available for platforms that support Oracle WebServer.

Pricing for WebRecruiter starts at $6,450.

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(212) 557-7000
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EveryWare Development Corp. has introduced Tango for Windows 95 and Windows NT.

According to the Mississauga, Ontario, company, Tango for Windows 95 and Windows NT connects Windows-, Unix- and Macintosh-based World Wide Web servers to standard databases. It comprises an application server and an editor. The application server will let Web servers access the database server, which can be on any platform. The editor features templates that can be used to generate Hypertext Markup Language and a SQL for interacting with databases.

Pricing for Tango for Windows 95 and Windows NT starts at $995 for a single-server, five-user license with one development seat.

▶ *EveryWare Development*
(905) 819-1173
www.everyware.com

Product short

Individual Software, Inc. has announced Learn Netscape Navigator Quick & Easy, a program with tips and shortcuts for using Netscape Communications Corp. Navigator client software. The software teaches Navigator 3.0 users about navigating the World Wide Web, subscribing to newsgroups and downloading free software through file transfer protocol. Cost: $20. Individual Software, Pleasanton, Calif. (510) 734-6767, www.individualsoftware.com.

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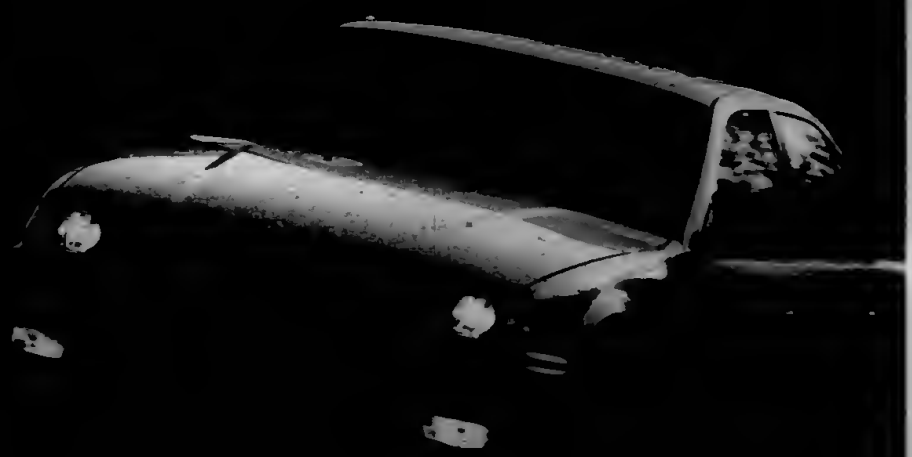

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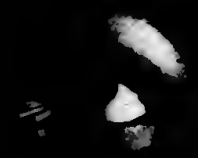

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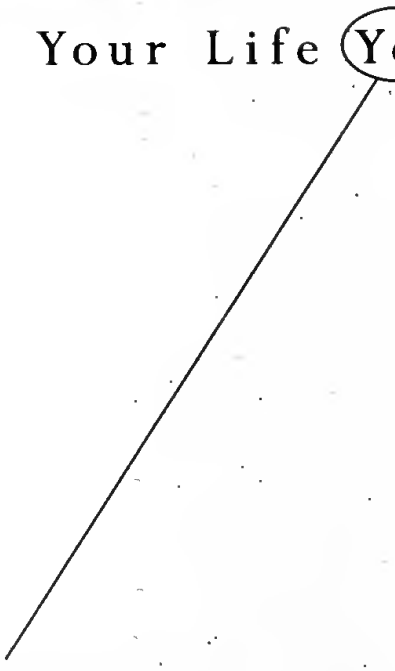

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Do you owe taxes on software? That depends, 78

Corporate Strategies

Web feat

Ducks Unlimited modifies mainframe to go online

By Michael Goldberg

As tracked on the World Wide Web, one duck's small steps could be a boon to the efforts of a major Canadian wildlife conservation group.

Ducks Unlimited Canada has set up a mainframe-based Web site to promote its mission and offer a glimpse of what it means to be a mallard hen that is trying to nest and hatch ducklings on the Manitoba prairie.

Ducks Unlimited represents one of what should be a growing number of VM operating system users who set up their mainframes as Web servers, said Mike Kahn, CEO of The Clipper Group, Inc., a consultancy in Wellesley, Mass. "It's going to be a hot topic because it's scalable. And in many cases, if you're looking at a larger VM platform, it's relatively cost-effective," Kahn said.

Accompaniments

By using an IBM 3090 200E with VM, Ducks Unlimited made part of its machine a Web server, said Mike Conchatre, manager of information systems at the group's headquarters in Oak Hammock Marsh, Manitoba.

The six-week project required TCP/IP-enabling software from IBM and a controller to connect its System/390 to the Internet via a frame-relay hookup.

You thought Mom had it tough . . .

Some observations of Hen No. 5, from "The Mallard Tracker"

April 19: Hen radio-marked.

May 14: First nest. Incubating.

May 15: Nest destroyed by predator (raccoon suspected).

June 2: Second nest. Incubating.

June 26: Brood hen. She hatched all 10 eggs!

July 2: Brood hen observed with six ducklings.

Ducks Unlimited *tracks mallard hens and posts the results on the Web*

Ducks Unlimited uses EnterpriseWeb from Beyond Software, Inc. in San Jose, Calif., to set up Web pages. EnterpriseWeb was designed to allow VM mainframe-based data to be viewed through standard Web browsers.

The main event at the group's Web site is "The Mallard Tracker," (www.ducks.ca/IWWR/tracker) an unfolding waterfowl drama started in May that tracks the weekly progress of 10 hens monitored via radio telemetry equipment. Based on field biologists' logs, "The Mallard Tracker" shows how hens live — and die — in a four-acre prairie section in southwestern Manitoba. Ducks Unlimited researchers there are studying how to help the mallards live with encroaching agricultural and commercial development.

For the nonprofit group, which was established in Canada in 1937, the Web site provides a new tool for education and advocacy, Conchatre said.

"Public education is a big thing for us. And with this Mallard Tracker, school kids can see and appreciate how difficult it is" for ducks to survive and breed in the wild, he said.

Brian Kazmerik, a biologist and senior systems analyst at Ducks Unlimited, said the tracking experiment has found that ducks are drawn to some of the nesting habitats that researchers have installed.

Kahn said Beyond Software and Sterling Software, Inc. offer Web server products for VM users.

Both vendors' products will let users isolate a Web server from other functions on the mainframe, providing security that is inherent in the VM environment, he said.

Health care system garners raves

Complex CHCS may help Pentagon realize $4.1 billion in benefits

By Gary H. Anthes
WASHINGTON

Taxpayers appalled by systems development fiascoes in government might be cheered by looking at the Pentagon's new health care system.

The U.S. General Accounting Office, best known for its caustic critiques of computer calamities, recently called the U.S. Department of Defense's $2.8 billion Composite Health Care System (CHCS) "a major achievement," especially "given the complexity of the system and the number of facilities involved."

Already deployed to all 526 medical facilities in the original plan, CHCS will produce some $4.1 billion in benefits over its 16-year life, the audit agency said.

CHCS handles a wide variety of chores, from medical treatment tracking to pharmacy and laboratory order processing to patient scheduling and hospital administration (see story, page 76).

In another unusual move, the GAO attributed much of the success to named individuals, especially to U.S. Navy Capt. Paul A. Tibbits, CHCS program manager since 1990.

Capt. Paul A. Tibbits: *The CHCS system allows Congress to rein in health care 'requirements creep'*

He "applied a set of fundamental information management practices that leading private and public organizations use for success," the GAO said.

"We credit the strong leadership," said Patricia Taylor, a director at the GAO. "Capt. Tibbits is very impressive; he's a doctor with a vast amount of information systems interests and abilities."

But Tibbits, a cardiologist, brushed off the praise, instead ticking off a half-dozen success factors, or "lessons learned."

He said representatives from every user constituency — doctors, pharmacists, nurses, radiologists and administrators — were assigned to the project full-time and were involved in virtually every design decision. "You can't make assumptions about user needs," Tibbits said.

Closer Inspection

Tibbits said he welcomed the intense scrutiny focused on the program by the GAO, Congress, a high-level Pentagon technical review group and an independent panel of senior users.

"A lot of people would say, 'Gosh, dealing with all those bureaucrats must have made life very difficult.' But if you listen to those people with all that experience, that's not all bad," he said.

In particular, Tibbits said CHCS benefited by a life-cycle cost cap written into law each year by Congress.

That imposed a discipline on project managers that would have been hard to achieve otherwise, he said.

"Every time we made a decision about which new software module to put out or which new hospital we were going to deploy to, we had to rerun our forecasting models to see what the cost implications of that change would be," he said.

The scrutiny from others and the cost cap made it easier to rein in "requirements creep" by offering a credible reason for saying no to users, Tibbits said.

But users apparently still called the shots to a consider-

Health care system, *page 76*

Just the prescription

"The physician is the ultimate end user," said Capt. Jeffrey Warhaftig, a resident in internal medicine at Walter Reed Army Medical Center in Washington. He said he spends 15% of his day at a CHCS terminal.

Warhaftig said he uses CHCS for near-real-time monitoring of patient laboratory test results, which used to arrive slowly on hand-delivered slips of paper. He also uses it to produce reports — some defined by him — that show trends in patients' vital signs, such as white blood cell counts in cancer patients.

Warhaftig also said the electronic-mail capability in CHCS is "the central core of communications" at the hospital. "When E-mail is down, the hospital is down," he said.

Warhaftig, a self-described computer enthusiast, said he is delighted with CHCS, but he acknowledged that some doctors are less than euphoric.

The GAO has in the past taken CHCS to task over physician complaints about data entry burdens.

But CHCS program manager Capt. Paul A. Tibbits is unrepentant. "Physicians' definition of the ideal computer system is 'nothing-in, first-out' — speech recognition," he said.

He said CHCS doctors readily use E-mail to type and edit their complaints about data entry, all the while using the very tools they are complaining about. — *Gary H. Anthes*

Health care

CONTINUED FROM PAGE 75

able degree. For example, doctors participating in design reviews insisted that screens be set up in ways that corresponded to the practices they learned in medical school, Taylor said.

Tibbits said senior Pentagon management formed an independent program review panel under the surgeons general of the Navy, Army and Air Force.

And concern for users is maintained in the operational system. For example, CHCS contains a real-time monitor that runs around the clock at every facility.

It sends an alert to IS management when actual response time exceeds standard, or expected, response time, Tibbits said.

CHCS features

Applications: Clinical, laboratory, patient admioistration, appointments, scheduling, pharmacy, radiology
Scope: 11 million patient records, 53,000 users, 526 sites worldwide, 23 million patients per year
Hardware: (1) Clusters of Digital Equipment Corp.'s Alpha servers running OpenVMS and DigitalVT or PC terminals; (2) clusters of Digital's VAX 6000 servers and networked PC servers running SCO Unix
Softwsre: Applications written in Mumps with FileMan database management system; DOD and commercial packages

Mass. tax returns are only a scan or phone call away

By April Jacobs

Tax season isn't everyone's favorite time of year, but the Massachusetts Department of Revenue is using a new imaging and workflow system to make the process a little faster for taxpayers.

The system has allowed the Department of Revenue to process tax returns more quickly and reduce the cost of processing returns by 26%.

Commissioner Mitchell Adams, whose department is responsible for collecting more than $11 billion in state taxes each year, said the system also makes workers more efficient.

It has allowed data entry workers to process more than 600 documents per day, compared with 350 on the older system. The older system required manual key entry of information.

"We had a pilot [project] a year ago, and that was just cutting our teeth," Adams recalled. "But this tax season, January through May, we really got flying."

The department spent last year working out the bugs — including the tendency of its newly designed, imaging-friendly tax forms to jam scanners. During the 1996 tax season, the department handled 1.3 million returns, about 45% of all the returns it receives.

Scanning tax returns also lets the department capture 50% more data than it did previously because storage and retrieval of information is less of an issue. Files used to be stored at a two-acre facility in suburban Medford, Mass. — far from the department's headquarters in Chelsea, Mass.

The Department of Revenue's Mitchell Adams: *The move to electronic processing was high-risk but paid off.*

File retrieval took up to two weeks. Now an optical jukebox holds that information.

The department in 1994 signed a deal with Unisys Corp. under which the state agency purchased $3 million in scanning and data storage equipment over two years and received free systems integration services and software development services.

Datacap, Inc. provided the data and image-capture software.

Worker efficiency

Alan Golobski, deputy commissioner at the department, said it retrained many workers to fit the new workflow system.

Instead of entering information about the return manually, employees scan returns with an Eastman Kodak Co. 923D machine, which can scan the front and back of a page simultaneously.

The scanned information receives an identification number. It is checked for errors and forwarded to an accounting posting system. That system processes the returns for checks to be issued or bills to be sent.

Electronic processing also allows more time to be devoted to scrutinizing returns.

Golobski said the department spends more time on audit leads and targets people who owe the most money. "The more quickly you can get to a person, the more likely you are to get your money," he said.

Adams said he refused to go ahead with the plan before getting firm assurances from high-level executives at Unisys that the company was committed to making the system a success — a failure would have meant disaster for his office. "It was high stakes, and it worked," he said.

Nathaniel Palmer, a senior market analyst at Delphi Consulting Group, Inc. in Boston said deals such as the Unisys/Massachusetts Department of Revenue contract can benefit both sides.

"All this techology is quickly becoming a commodity, so what [Unisys is] selling is not an imaging system, per se, but expertise," Palmer said. The department gets the best available system, he said. "Unisys wants to be able to replicate that system, so it's worth it to them to make sure it's right."

The department also let more than 400,000 taxpayers file via telephone this year. All would have filed the short form under the conventional system. They instead took several minutes to dial in their income figures and received refund checks within several days of filing, Golobski said.

Briefs

The outsourcing side of Sears, Roebuck

Sears, Roebuck and Co. signed a five-year outsourcing deal with IBM's **Integrated Systems Solutions Corp.** (ISSC) under which ISSC will manage distributed desktop computing for Sears corporate headquarters in Hoffman Estates, Ill. ISSC also will provide help desk services to all Sears locations and back-office systems management for Sears stores. Terms of the agreement weren't disclosed. The deal follows an expired desktop support contract Sears had with **Advantis**. Advantis will continue to support Sears' data center operations, network and voice operations for the next six years, said Don Zimmerman, a senior systems director at Sears. The desktop support deal with ISSC covers 6,000 machines.

Unisys wins government contract

Unisys Corp.'s Federal Systems Division won a contract from the **Social Security Administration** to install 1,700 LANs and 56,500 workstations at more than 1,500 Social Security offices. The value of the seven-year deal has the potential to reach $280 million.

Web registry for open systems

The Open Group consortium launched a World Wide Web-based registry for open systems software. The Open Software Registry (www.opensoftware.com) initially is just an online version of the UniForum association's vendor-supplied catalog listings. But The Open Group hopes to persuade vendors to use third-party testing software that checks for conformity to standards such as its own Single Unix Specification.

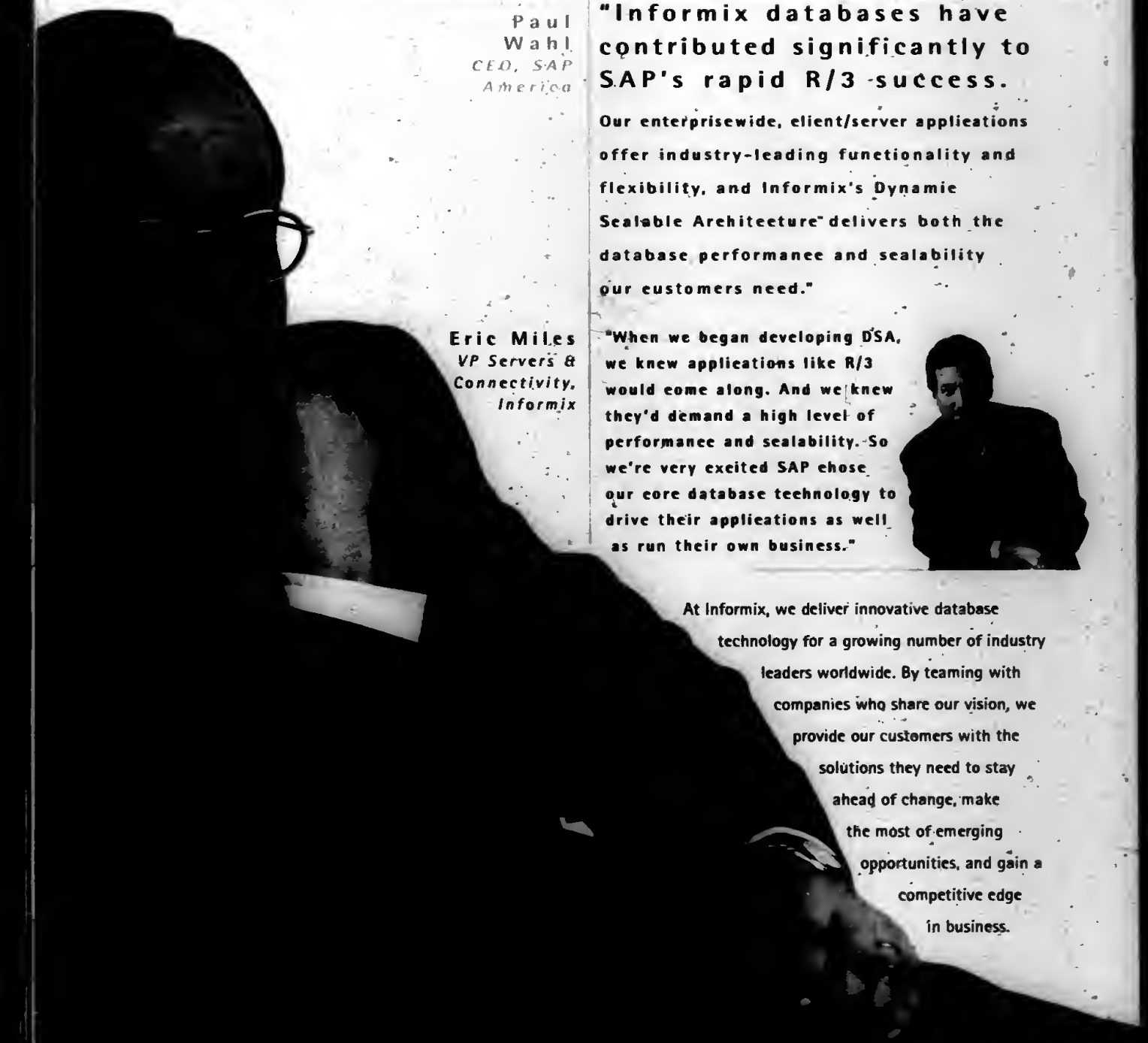
Health alliance plan

Allina Health System in Minneapolis formed partnerships with **IBM** and **MedicaLogic** to develop Allina HealthVillage, a custom online network. It will offer a wide range of medical information to Allina's members. MedicaLogic, a medical software company in Beaverton, Ore., will work with Allina to help Allina's hospitals, clinics and health plans integrate computerized medical records into the system.

SIM working groups

The Society for Information Management (SIM) is forming several working groups to address topics of interest to member organizations and the information technology industry. The SIM working groups that are seeking members include Measuring the Business Value of IT: Integrating IT and Business; IS Process Architecture: Moving to Implementation; Transformation 2000: IT Challenges for Year 2000 Date Conversion; Collaborative Computing; and Groupware: East Coast. For more information, call Laura Gramling at (312) 644-6610.

SAP's Paul Wahl, on Informix.



Paul Wahl
CEO, SAP America

"Informix databases have contributed significantly to SAP's rapid R/3 success.

Our enterprisewide, client/server applications offer industry-leading functionality and flexibility, and Informix's Dynamic Scalable Architecture™ delivers both the database performance and scalability our customers need."

Eric Miles
VP Servers & Connectivity, Informix

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INFORMIX

Do you owe taxes on software? That depends

By Robert C. Sash and Sidney S. Silhan

If you are involved in software purchasing, you can't afford to be unfamiliar with sales tax issues. Some companies have overpaid for their software because they were ignorant of sales tax laws.

Although each state has its idiosyncrasies in how it determines what is taxable and what isn't, there are a few things to bear in mind that will help determine if you are being charged the appropriate amount of tax.

• **Types of software:** From a tax perspective, there are two broad categories of software. Canned software is prewritten, can be bought off the shelf and generally is taxable. Custom software — which doesn't include any prewritten or preproduced modules — is exempt from sales or use taxes in many states but not all. Some states are unclear about what constitutes custom software and how much canned software must be changed to be classified as custom.

• **Modifications:** Some states tax any modification to software; others don't tax significant modifications. Many states that don't tax modifications, however, often require that the charges for modifications be stated separately from other charges that appear on the bill.

• **Installation and training services:** Many states don't subject software installation services to sales or use taxes. Other states base the taxation of installation services on the taxability of the underlying software. Still others tax installation services of any kind of software. Generally, states don't tax training provided by software vendors to clients, although the training must be separately stated from other charges.

• **Maintenance contracts:** Some states tax all maintenance contracts, regardless of whether they include transfers of tangible personal property or involve only the sale of services. Other states don't tax maintenance contracts if the service portion is separately stated or billed.

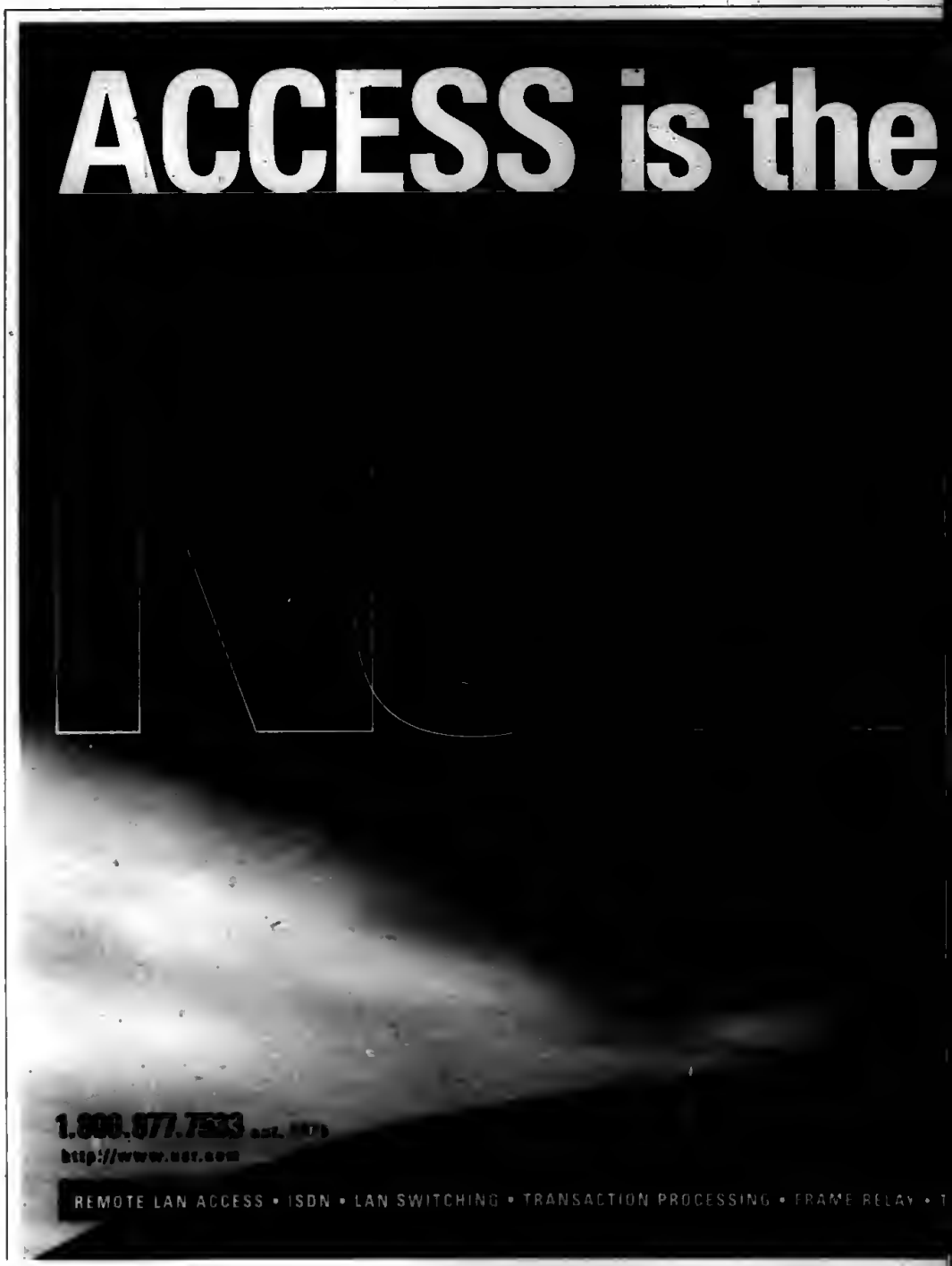
• **Sale vs. lease:** Many states don't tax software leases, although they may tax the sale of such software. There are rules that must be followed to classify a lease for taxation purposes.

• **Potential exemptions:** Some states offer sales and use tax exemptions on certain types of products. For example, software used in manufacturing tangible personal property is often exempt.

• **Transmitting software to customers:** Some states tax software regardless of how the software is transmitted to the purchaser. Other states will tax only software that is delivered to the customer on a disk or other tangible medium and will exempt software that is transmitted electronically. But this exemption could be lost if any tangible property is delivered. To avoid this, software developers should charge separately for anything that isn't sent electronically.

Perhaps the best advice for those who purchase software is to work with vendors to determine the least expensive way to handle the transaction — and, most important, be savvy about your state's tax laws.

Sash is a partner in Arthur Andersen & Co.'s Chicago office and is deputy director of the firm's State and Local Tax (SALT) practice. Silhan is a senior tax consultant in the Chicago SALT practice. They can be reached at (312) 580-0033.



MasterCard tests a smart way to trash cash

By Betty B. Daguio
MANILA

The world's first reloadable stored-value smart card is being beta-tested by MasterCard International, Inc. in different parts of the world.

The MasterCard Cash smart card is a chip-based application that is programmed to store a value of up to $100. It was designed as a fast, convenient alternative to coins and bills for making purchases, typically less than $20.

The stored cash amount is reduced every time consumers spend their electronic cash. No personal identification numbers or transaction codes are necessary, and the value of the purchase is transferred from the customer's smart card to the merchant.

The smart card, developed in Canberra, Australia, has a Unix-based back-end system that runs an Oracle Corp. database to do transaction processing, clearing and settlement, fraud reporting, lost or stolen card recovery and customer service.

Jerry McElhatton, president of global technology and operations at MasterCard, said third-party vendors have provided the infrastructure for MasterCard Cash.

The main hardware platform used is from AT&T Corp., but this will be upgraded to a Sun Microsystems, Inc. high-end server to run the required large, central Oracle database.

McElhatton said pilot programs are being done in New York, involving 50,000 customers and 500 area merchants. Other pilots are also taking place in Latin America and South Africa, using a multitude of vendors and systems to make sure the card is interoperable.

The nine-month Canberra trial, meanwhile, involves three financial firms that collectively will issue 10,000 smart cards.

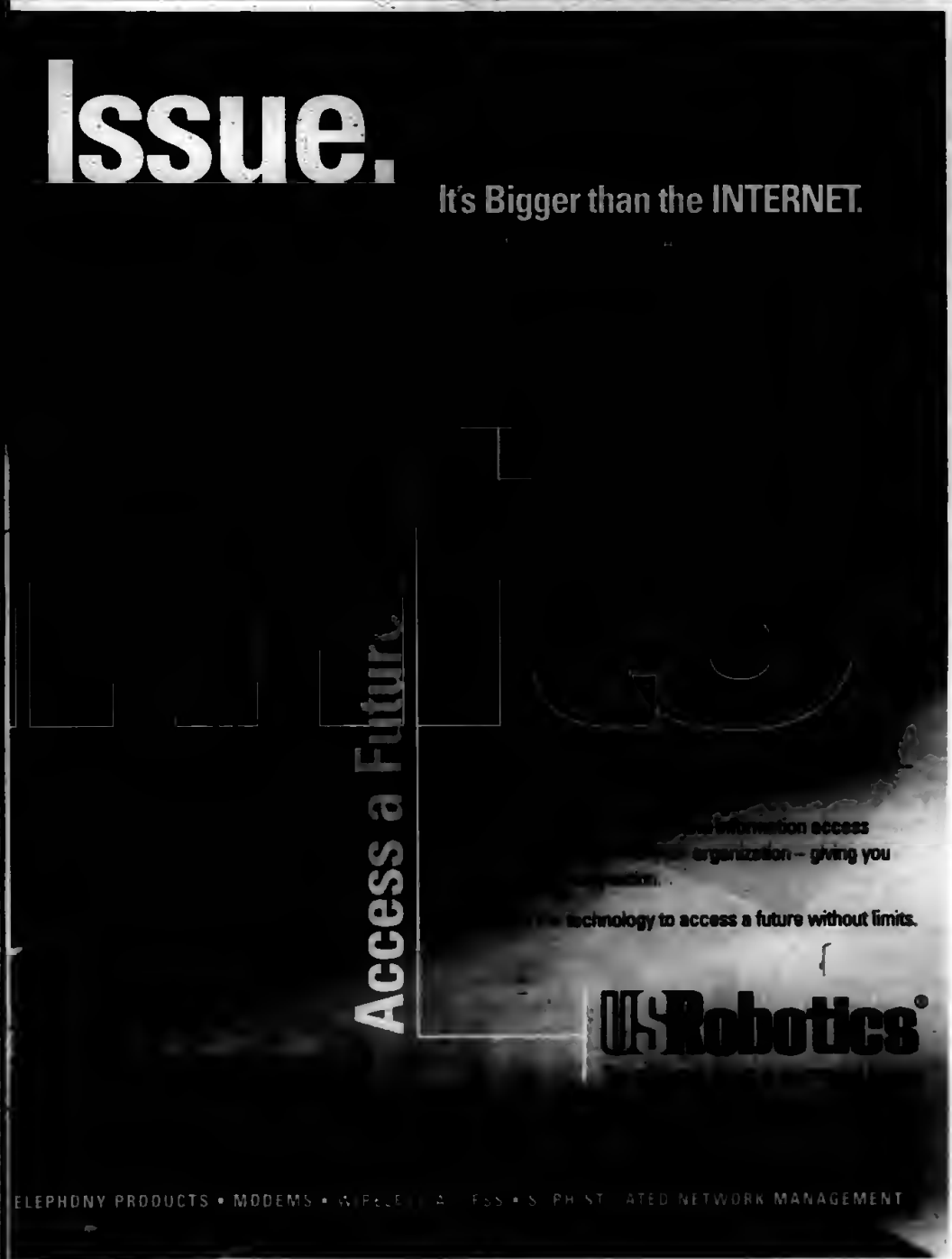
MasterCard officials said hybrids with both magnetic stripe and chip technology will be common in the transition to smart cards. This is to ensure acceptance of the new technology as banks move to introduce smart-card readers globally.

"I think it would be a long time before the magnetic stripe card would be obsolete, but the chip card is much more powerful and has the potential for growth," McElhatton said. Within two to five years, the market will see a lot of smart cards with reloadable computer chips, he said.

MasterCard also is involved in securing card transactions online and marketing through the World Wide Web. It endorses an industry specification to secure electronic commerce on the Internet, called the Secure Electronic Transactions.

MasterCard also plans to tap the Internet to corner the $1.5 trillion market for electronic payments.

Daguio writes for *Computerworld Philippines*.



Briefs

Low rates from IBM

IBM Credit Corp. has implemented reduced financing rates for IBM and non-IBM software and services. Customers with top credit ratings now qualify for rates as low as prime on leasing deals of 36 months or less. And up to $250,000 worth of software and services can be financed without any hardware being involved.

Building warehouses

Sears, Roebuck and Co. has selected IBM's RS/6000 SP server and Informix Software, Inc.'s OnLine Extended Parallel Server database system to help the retailer build several large data warehouses, beginning with its credit and home services businesses.

intel inside
pentium

Toshiba, IBM, Compaq, Dell and HP all claim to make durable notebooks.

But can they withstand this severe blow?

Ascentia J50 *133MHz Pentium® processor, 10.4" SVGA TFT, 2 Type II or 1 Type III PC card slots, 800 MB removable hard drive, built-in 16-bit CD quality audio, integrated 14.4 modem, Lithium Ion battery, weight: 5.8 lbs.*

The truth hurts. But there it is in writing. *PC Week* named the AST Ascentia J50 the best. Or more specifically, "in a crowd of 133MHz notebooks, Ascentia is the head-turner." And no wonder. It's lightweight, super-fast and aggressively priced. Plus we back it up with a 3-year worldwide limited warranty and Express ONE, our optional, next business day, on-site replacement program with FedEx. To learn even more, just give us a call at 800-876-4AST or see us on the net at http://www.ast.com. And ask about the notebook *PC Week* calls a knock-out.

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Managing

HOT HAPPENINGS
Want to take in a fall conference? Check out five "can't-miss" choices. Page 88.

Scott Matthews

Break out the champagne, it's a crisis!

Don't let long nights and working weekends ruin your team. Treat those stress-filled times as opportunities for bonding.

By Natalie Engler

What do Little Red Riding Hood, a hot air balloon and a high school gym have in common?

Stumped? So was Robin Hodder's team of technologists when she asked them that question at 3 a.m. on a Saturday. They were alone in Bank of Boston's trading room in the midst of a weekend-long systems test. Phones were ringing, programs were running and the air was filled with the smell of stale pizza.

Sensing that they needed a pick-me-up, the senior manager broke out Tribond, a game that lists groups of three seemingly unrelated items and asks what links them. Finally she answered: "They all have baskets." Then she moved on to questions about popular culture — and tracked how many times they answered "Farrah Fawcett." Not only did the silliness keep them awake, but also "I gained a lot of insight into the way my staff thinks," she says with a chuckle. "Now I know all their innermost secrets."

Savvy managers such as Hodder are discovering that a project's almost inevitable "Weekend from Hell" doesn't have to burn the team. When they plan for those fires, more often than not they fuse into a cohesive unit.

Continued on page 82

CONTINUED FROM PAGE 81

Here's how it works...

Goal:
Choose the right people

Tool:
An index to identify individual strengths

Don't put just anyone in your foxhole. A team made up of people who complement and reinforce one another's skills is more likely to endure when crunch time arrives.

Kathy Kolbe, CEO of Kolbe Corp., a consulting firm in Phoenix that specializes in organizational development and performance forecasting, says the secret to building a high-performance team is to focus on "the natural way people do things." In this spirit, she spent the past 20 years creating tools to identify people's instinctive strengths, much like the well-known Myers-Briggs personality profiling method. She calls those strengths "action modes" and labels people with those tendencies Fact Finders, Follow Thrus, Quick Starts and Implementers.

Fact Finders tend to be thorough, precise and detail-oriented, she says. If you withhold from them even seemingly irrelevant specifics, the resulting stress will hurt their performance. Follow Thrus are good at classifying, organizing and integrating information — as long as they have a context. Give them a flowchart, plan or matrix, and you'll see the difference. Quick Starts can promote and sell a project. But they may oversell it, creating stress for the team. Implementers work best with the mechanics of the environment. They are nonverbal, hands-on and often overlooked — and projects that ignore them may wind up with software that doesn't run on the machines.

In designing a team, make sure you cover all the categories, Kolbe says. People perform best when they are in their proper roles and understand one another's ways of working.

Goal:
Create camaraderie

Tools:
Racquetball, the beach, Jazzercize

Once you have the best mix of people, the next step is to build camaraderie.

"One of the best project managers I've seen started bonding people at the beginning of the project," says John Sifonis, founder and CEO of management consultancy Siberg Associates, Inc. in New York and author of *Corporation on a Tightrope*.

"He begins every project by assigning a project leader as manager and sending the team to a two-day off-site meeting," Sifonis says. There they learn about how a project's politics and dynamics can change, what problems to look for and how to deal with personality clashes. They also engage in intense physical activities, such as racquetball, followed by dinner and drinks until dawn. The next morning they wake up early and jog together before an 8 a.m. breakfast and repeat the drill. "By the end of the weekend, the teams would walk over hot coals for [the project managers]," Sifonis says.

Hodder's team remains tight thanks to beach outings and takeout dinners at her house. One time the team members even went to a Jazzercize class together. "All of that helps," she says. So do biweekly status meetings during which everyone speaks. "We go around the table, and if someone is stuck or behind, others offer to help. Initially you encourage this. Then it starts to happen naturally."

Goal:
Minimize stress when the crisis hits

Tools:
Food, champagne, massages, taxis

When a manufacturer's order-entry and inventory systems went out of sync, it had no recovery plan. So senior managers called in Gopal Kapur, president of the Center for Project Management in San Ramon, Calif.

Here's what he advised: Isolate the senior managers for several hours so they can avoid "inane" questions such as "Who did it?" and "When will the problem be fixed?" Next, designate one "press" person to provide periodic updates. Eliminate the words "should have" and "fault" from everyone's vocabulary for the recovery's duration. And reduce the stress placed on the recovery team's technologists so they'll make fewer mistakes.

To reduce stress on the team members, the company brought in massage therapists. A human resources person delivered food and champagne. ("People need champagne more when they are under stress than when they are celebrating," Kapur says with a smile.) And the company hired taxis to ease exhausted team members' commutes. The process was so successful, the company is making it part of its long-range disaster recovery plan, Kapur says.

Goal:
Energize with laughter

Tools:
Poster board, sayings, country music

Minimizing stress helps avoid despair. But to really boost performance, there's no stimulant like laughter.

Bob Dorsey, SAP project manager at Eastman Chemical Co. in Kingsport, Tenn., credits humor — and Kathy Kolbe's method of indexing team members' strengths — with helping his team complete a major companywide SAP implementation in just 20 months with no turnover.

When times got tough, Mark Callahan, a country music-singing team member, would write a song about it, such as "We Are the Crazed," sung to the tune of "Those Were the Days."

The night before Hodder's team faced a particularly depressing status meeting, she grabbed a piece of poster board and wrote down each member's pet expressions. The next day, after they finished lamenting the state of the project, she pulled out the board and revealed the phrases one by one.

"'Done. Boom.' ... Who says that?" she asked. They grinned and pointed at a sheepish teammate. Next: "How does this affect me?" Then: "Zoiks!"

"What a difference it made in their attitudes," she recalls. "It pulled them out of the pits of depression when they needed it." And it got them back into the project's groove. ■

Engler is a freelance writer in Cambridge, Mass.

F.Y.I.

Fear of information

Russians may use computers, but they're a long way from entering the Information Age.

Ella V. Chapaitis, a professor at Fairfield University in Fairfield, Conn., spent three years studying information systems practices in Russia.

Or trying to.

She was evicted from her apartment in Kemerovo, a large Siberian city, for interviewing Georgians. Many Russians — including her former landlord — stereotype Georgians as criminals. She couldn't distribute questionnaires, tape-record interviews, ask blunt questions or take notes in front of the people she interviewed; all those things aroused fear and suspicion. "For Russian managers, it seems almost unprofessional to talk openly," she says. Most interviews were conducted while walking outdoors.

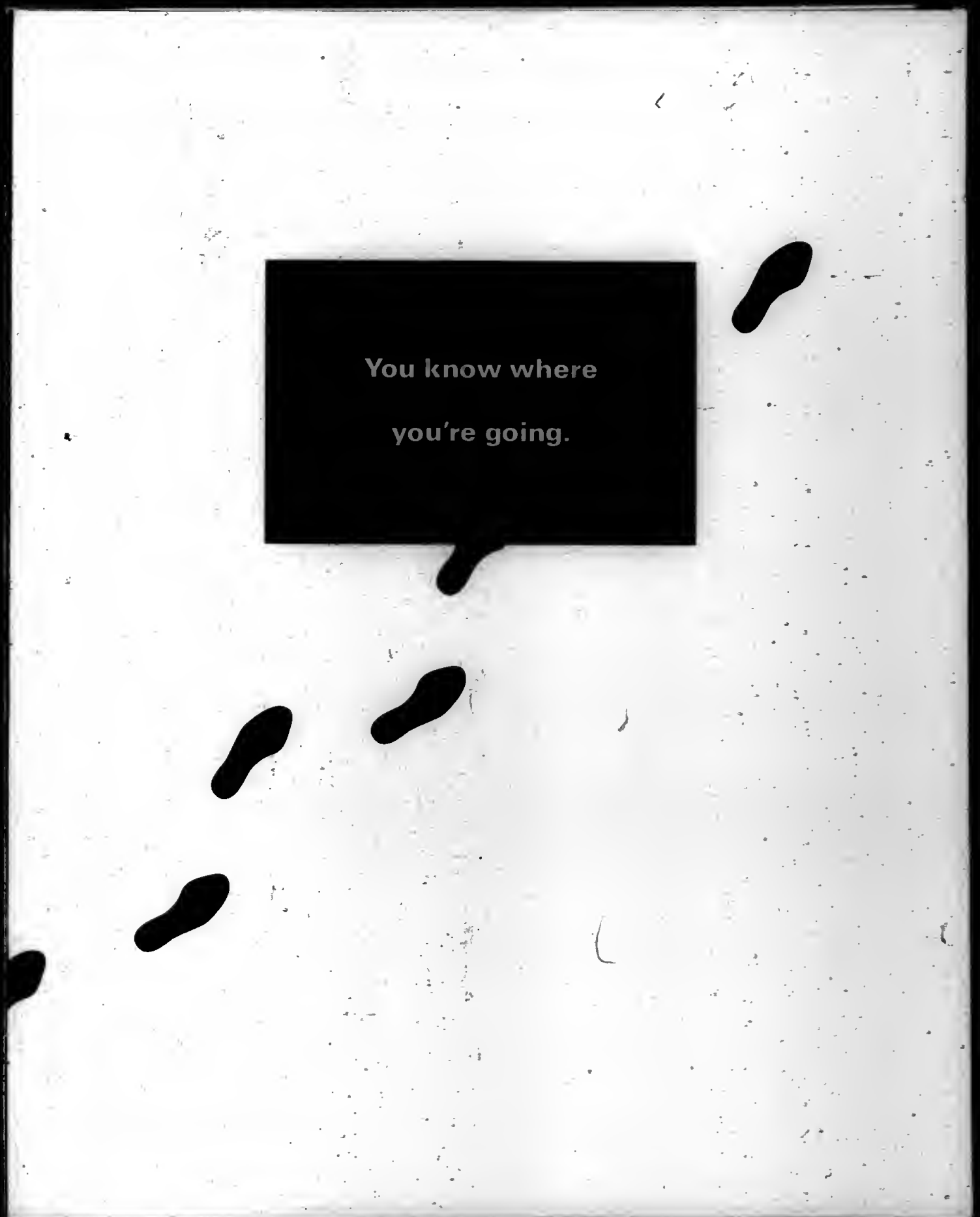
But the plucky professor managed to finish her study. Not surprisingly, she found that a lack of high-quality data seriously hampers the development of IS in post-Soviet Russia. Irregular accounting practices, lack of statistics, managers who won't share information and fear of disclosing information are just a few of the barriers for IS and IS professors.

Fear of information is hampering Russia's service industries. They want to use IS for operations but have a hard time getting information. For example, Chapaitis says, IS managers at Garant, a Russian insurance company with offices in Kemerovo, can't obtain actuarial data and have difficulty collecting information from their clients.

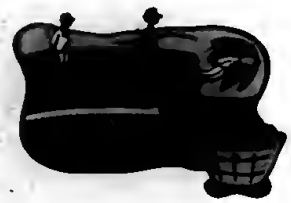
Chapaitis' findings are one of many reports in "Global Information Technology and Systems Management: Key Issues and Trends," a collection of studies on IS practices around the world edited by Prashant C. Palvia, Shailendra C. Palvia and Edward M. Roche (Ivy League Publishing Ltd., Nashua, N.H.; 1996; 635 pages; (603) 891-0669).

— *Allen E. Alter*

More F.Y.I., *page 84*


You know where
you're going.

F.Y.I.



IS — by the numbers

Deloitte & Touche Consulting Group has come out with its annual survey of chief information officers. Here are some nuggets that widened our eyes. The consultancy in Wilton, Conn., surveyed 431 CIOs late last year and early this year. To obtain a copy, contact Jan Finnegan (in Kansas City, Mo.) at (816) 881-5118 or by electronic mail at jfinnegan@dttus.com.

Spending is on the rise . . .

IS spending is increasing faster than the inflation rate

	(Average IS budget increase)	(Consumer price index)
1995	6.3%	4.5%
1994	3.5%	2.7%
1993	0.4%	2.7%

. . . as is spending on IS training

(Training spending as percentage of IS budget)

1995	4.3%
1994	3.0%

Hard to find

Think SAP experts are tough to find? Here are four positions that CIOs feel are even harder to fill.

(Percentage of CIOs listing position as difficult to fill)

Client/server technical architect	77%
Database expert, distributed	68%
Data modeling expert	64%
GUI designer	63%
SAP application expert	57%

See you later!

Annual CIO turnover rate:

17%

Call in the network guy

80% of CIOs say communications and networking is the most important technology for re-engineering. But Chuck Nunamaker, a principal at Deloitte & Touche, says networking experts are rarely part of re-engineering teams. .

Internet barriers

The usual barriers to new technologies — lack of tools, personnel and costs — aren't holding back the Internet right now. It's security concerns and the what-do-we-do-with-it factor. "Businesses haven't figured out how to use the Internet, so it's taking a backseat to other applications where the use of the technology is clearer," Nunamaker says.

(Percentage of respondents reporting the barrier as significant)

Security limitations	81%
Other projects having higher priority	68%
Lack of proven business benefits	63%
Immature technologies	51%
Uncertainty about future Internet direction	38%
Lack of qualified developers	30%
Lack of development tools	23%
Complexity	17%
Cost	16%

Lights! Camera! Dilbert?

You loved the comic strip. You bought the book. Are you ready for *Dilbert, the Movie*?

We are. And though we don't know whether cartoonist Scott Adams is bound for Tinseltown — *Computerworld* doesn't have a Hollywood bureau — we aren't afraid of suggesting a few actors who would be perfect. Here are our picks; submit your selections to our Web site, @Computerworld (www.computerworld.com), and surf the site this week for the "casting call."

Dilbert — Anthony Edwards (star of *ER* and *Revenge of the Nerds*)

Dogbert — Danny DeVito

Ratbert — Tom Hanks

Catbert — Joe Pesci

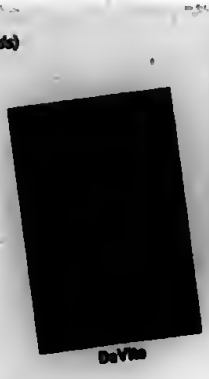
The Boss — Ned Beatty

Alice (female engineer with triangular hair) — Bette Midler

Wally (short, bald engineer) — Jason Alexander

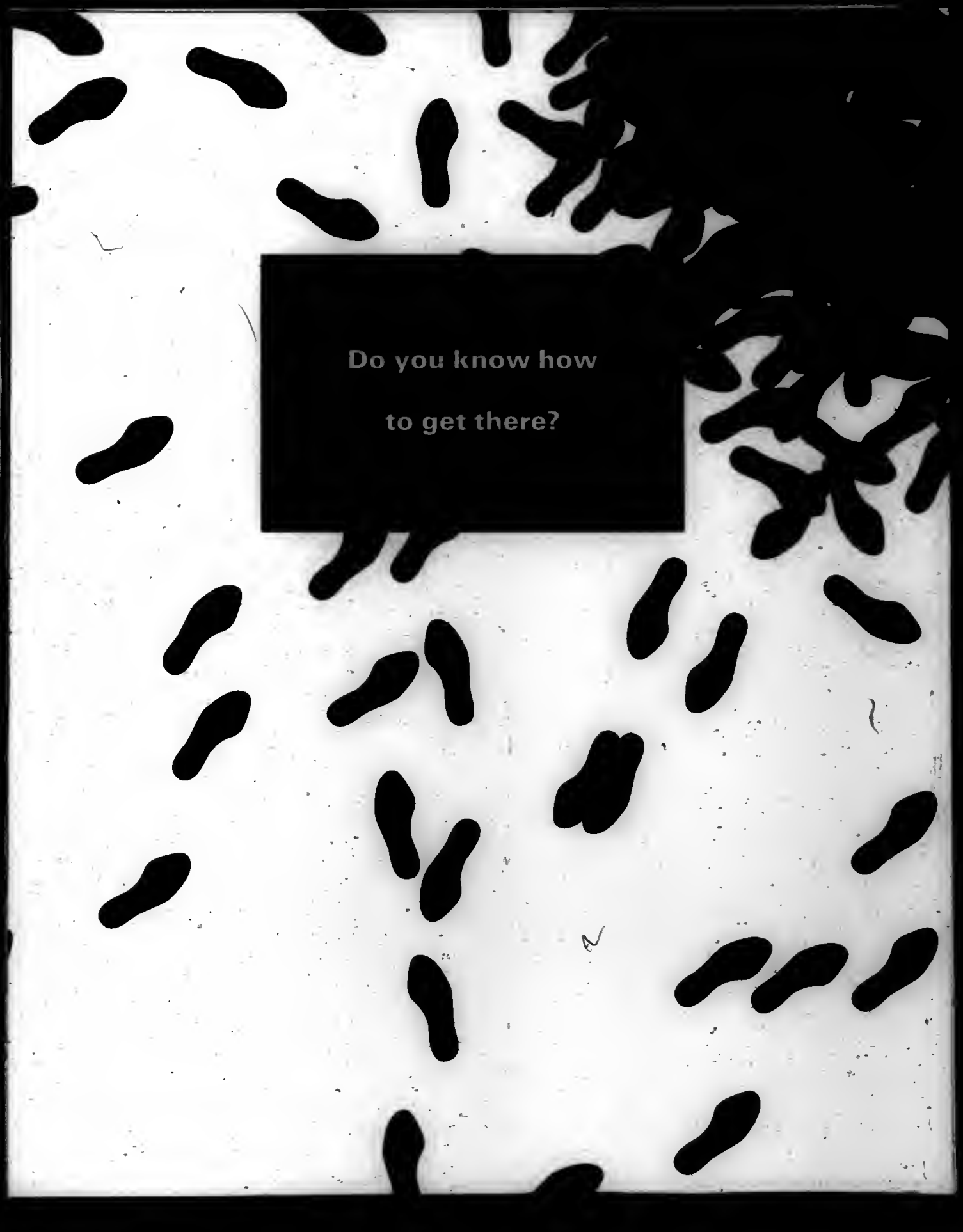
Young, naive engineer — Matt LeBlanc (*Friends*)

Phil, the Prince of Insufficient Light — Jerry Seinfeld



DeVito

Edwards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OCTOBER - DECEMBER 1996

HOT HAPPENINGS

Our picks for the IS events you gotta get to

Gartner Symposium/ITxpo '96

Walt Disney World Dolphin and Swan hotels
Disney's Yacht and Beach Club Resort
Lake Buena Vista, Fla.
Oct. 7-11

Are you looking for a 50,000-ft.-high view of information technology developments and trends? Don't mind enduring sweltering humidity to get it? Then head for central Florida. Each year, thousands of information technology professionals flock to Gartner Group, Inc.'s weeklong symposium. Gartner dishes up a comprehensive look at the state of information systems; it's hard to think of a technology, trend or management issue that's left unturned. One-on-one time is also available with Gartner analysts. But be forewarned — the place is crawling with Gartner sales representatives. This year's theme: "Managing Diversity in the 21st Century." You may not go home tanned, but you will be well-informed.

Cost: $1,[illegible] (Gartner clients); $2,195 (nonclients)

Contact: Gartner Group, Stamford, Conn.
(800) 778-1997 or (203) 316-6757
E-mail: apearce@gartner.com
Web address: www.gartner.com

National IS Security Conference

Baltimore Convention Center
Oct. 22-25

Like it or not, the feds strongly influence information security standards and technology, which makes this annual gathering of government security gurus a must for computer security professionals. The event is cosponsored by the National Institute of Standards and Technology (NIST) and the National Security Agency's (NSA) National Computer Security Center. There will be sessions on the latest security technology and issues, including firewalls, intrusion detection, cryptography, Internet security, electronic commerce and legal issues. This may be the only opportunity you'll ever get to talk to people who will admit they work for the NSA and, even more astounding, will tell you what they do.

Cost: $295; $335 after Sept. 20.

Contact: Tammie Grice, NIST, Gaithersburg, Md.
(301) 975-3883
E-mail: NISSConference@dockmaster.ncsc.mil
Web address: csrc.nist.gov/nissc/

Comdex/Fall '95 *drew nearly 207,000 attendees*

Comdex/Fall '96

Las Vegas Convention Center
Nov. 18-22

A sure bet for anyone interested in PCs. With about 2,200 exhibitors on tap, Comdex organizers expect this year's attendance to exceed last year's turnout of close to 207,000, so you may want to make your plans now. The show is in its 18th year as the world's largest and most prominent information technology event for resellers and corporate decisionmakers. The conference and exhibition highlight the latest advances in stand-alone systems, including software applications, personal digital assistants and multimedia systems. But rooms and taxis are hard to find, and the sheer size of Comdex could exhaust a triathlete. And if networked applications are your thing, you'll probably do better at Networld/Interop Atlanta, which will be Sept. 16-20.

Cost: To be announced

Contact: Softbank/Comdex, Needham, Mass. (617) 433-1665
E-Mail: ambrose@comdex.com
Web address: www.comdex.com

Fall Internet World '96

Jacob K. Javits Convention Center, New York
Dec. 9-13

Internet World is the 'net show to attend this fall if you have time for just one. It's emerged as the PC Expo of Internet events. Mecklermedia Corp. officials say there will be 140 sessions and 550 exhibitors interhawking all sorts of Internet products and services. IBM Chairman Louis V. Gerstner will be one of six keynote speakers. Whatever is making the rounds in 'net circles — from hot new products and services to vendor big shots explaining their Internet strategies — is sure to stop at the Big Apple's Cavern on the Hudson.

Cost: To be announced

Contact: Mecklermedia, Westport, Conn.
(800) 632-5537
E-mail: falliw@mecklermedia.com
Web address: events.iworld.com

Winter Project World

Santa Clara Convention Center and Westin Hotel
Santa Clara, Calif.
Dec. 9-13

If Dustin Hoffman were to revive his role in *The Graduate* for the '90s, perhaps the hot-tip career advice he'd get is "projects." For those who want to improve their project management skills, it's hard to beat Project World. The focus is on IS development. The presenters are seasoned project managers. The tracks and sessions cover practically any problem that might be eating your liver, and the attendees are people who sweat the details and the deadlines, just like you. You should emerge from this conference a shrewder project manager. If you can't wait until December, Summer Project World East is Aug. 5-9 at the Omni Shoreham Hotel in Washington. Organizers claim there will be little overlap between the two events.

Cost: $395-$1,595.

Contact: Center for Management Research, Wellesley, Mass. (888) 943-4444 or (617) 431-9797
Web address: www.projectworld.com/projectworld

Computerworld staff members Allan E. Alter, Gary Anthes, Rick Saia, Craig Stedman and David B. Weldon contributed to this report.

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21. Director/Mgr. MIS Services, Info. Center
22. Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr./PC Mgr., Tech. Planning, Administrative Services
23. Dir./Mgr. Sys. Development, Systems Architecture
31. Programming Mgmt., Software Developers
41. Engineering, Scientific, R&D, Tech. Mgmt.
60. Sys. Integrators/VARs/Consulting Mgmt.

CORPORATE MANAGEMENT
11. President, Owner/Partner, General Mgr.
12. Vice President, Assistant VP
13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
51. Sales & Marketing Mgmt.
70. Medical, Legal, Accounting Mgmt.

OTHER PROFESSIONAL MANAGEMENT
80. Information Centers/Libraries, Educators, Journalists, Students
90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

Operating Systems
(a) Solaris (e) Mac OS
(b) Netware (f) Windows NT
(c) OS/2 (g) Windows
(d) Unix (h) NeXTstep

App. Dev. Products ❑ Yes ❑ No
Networking Products ❑ Yes ❑ No

4. How many people are employed at this location and in your entire organization, including all of its branches, divisions and subsidiaries?
(Select only one per column.)

	1 At this location	2 Entire Organization
A. 20,000 +	❑	❑
B. 10,000 – 19,999	❑	❑
C. 5,000 – 9,999	❑	❑
D. 1,000 – 4,999	❑	❑
E. 500 – 999	❑	❑
F. 100 – 499	❑	❑
G. 50 – 99	❑	❑
H. 20 – 49	❑	❑
J. 10 – 19	❑	❑
K. 1 – 9	❑	❑

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65. Communications Systems/Public Utilities/Transportation
70. Mining/Construction/Petroleum/Refining/Agriculture
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85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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C. 5,000 – 9,999	❑	❑
D. 1,000 – 4,999	❑	❑
E. 500 – 999	❑	❑
F. 100 – 499	❑	❑
G. 50 – 99	❑	❑
H. 20 – 49	❑	❑
J. 10 – 19	❑	❑
K. 1 – 9	❑	❑

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- **Analysis:** Internet Security: The right mix of technology and good management can tame the malicious and the clueless.
- **Projects:** A new 10,000 user intranet will help AT&T's Customer Care Division service new markets.
- **Explainer:** The new breed of hybrid firewalls let buyers mix and match encryption, packet filtering and other technologies.
- **Advice:** [illegible] part

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Olympics in cyberspace
For an up-close-and-personal look at IBM's worldwide Olympic system, including its unprecedented Web presence, see the technology map on pages 92 and 93.

BIG BLUE

GOES FOR THE GOLD

Summer Olympics, IBM hopes to get out of the peak and regain its status as the computer company. Failure here would be the ultimate sting of defeat.

BY JOSEPH MAGLITTA

What do you do when you're the world's biggest computer company and you've got the rapt attention of 3.5 billion viewers? Sell computers, of course. Or at least, strut your technological stuff.

That's just what IBM will be doing when the 1996 Summer Olympic Games open in Atlanta this week.

For 17 days, Big Blue will use its role as sole information systems sponsor of the Olympics to recapture its lost glory as *the* computer supplier to the world. In the past 15 months, IBM has constructed a gargantuan worldwide information system that includes more than 100 applications. The system is meant to showcase manageability, security, availability and scalability.

"IBM's message is clear: IBM can provide one-stop shopping for all the information technology needs of an entire enterprise — systems, network solutions, software and service," says Joe Clabby, director of transitional technologies at Aberdeen Group, Inc. in Boston.

Sound like a throwback to the old captive-customer days? Not everyone agrees, says Clabby, author of a recent report on Big Blue's Olympic technology. Large customers and many European firms find "a certain, safety" in dealing with IBM, especially in the strange new territory of cyberspace, he says.

Among the new products to be demonstrated: Net Commerce Internet commerce server software and Web Objects Manager technology. New roles for AS/400s as distribution servers will also be highlighted.

Will IS leaders be wowed? It depends.

Stuart Greenfield, who helps oversee a showcase IBM ES-9000 site at the Texas Comptroller of Public Accounts, says the IBM tour de force sounds impressive. But he says the state will look for best-of-breed solutions on the Internet and elsewhere.

Heeding commands reportedly handed down from Chairman Louis V. Gerstner, the Olympic effort involved nearly every corner of IBM: 38 business units on six continents. In terms of personnel and development time, the effort cost IBM far more than its $40 million sponsorship fee.

IBM's public relations machine has been barnstorming the country. A specially equipped Winnebago displays a half-dozen of the most impressive systems, including the first official Olympic home page and a Notes-based master security system.

IBM has taken great pains to avoid the worst-case scenario — a globally televised crash and meltdown, says Jose-Luis Iribarren, manager of Olympic and Sports Interest Systems at IBM. He says IBM has made the system bulletproof by building in extensive redundancy and backups. The company has also created an architecture that widely distributes processing power.

Clabby says IBM has a good chance to pull off the Olympian feat. "If IBM scores a perfect 10, it will have sent a message to the world that IBM is still the premier supplier of complex systems," he says. ■

Maglitta is *Computerworld*'s senior editor, corporate strategies.

OLYMPICS

www.atlanta.olympic.org

FACTS

SUPERLATIVES (Source: IBM)
"First Olympic Web page"
"Highest trafficked, most dynamic Web site to date"
"Largest peacetime event ever"
"Largest, most complex sporting network ever"
"Largest integrated information technology system ever demonstrated to a mass audience"

OWNER
Atlanta Committee for the Olympic Games (ACOG)

WEB SITE LAUNCHED
April 1995

COST
Covered by $40 million IBM sponsorship. ACOG pays undisclosed fee for each transaction on ticket server.

ARCHITECTURE
Three-tier client/server system. Includes four IBM System/390 mainframes, 300 LANs, 7,000 IBM PCs and ThinkPads, 80 AS/400 servers, two RS/6000 SP massively parallel processors

APPLICATIONS
100 at 30 venues

ON-SITE USERS
150,000, including:
40,000 volunteers
31,000 employees
15,000 athletes
15,000 members of the media
100 heads of state

WEB TRAFFIC
Before Games:
About 250,000 visits daily
During Games: More than 6 million expected daily

STAFFING
More than 750 person-years of software support; 87 developers; 200 workers from IBM's Integrated Systems Solutions Corp. on-site; 5,000 technical volunteers

LINKED WEB SITES
About 10,000

NEXT USES
Olympics:
Nagano, Japan, 1998
Sydney, Australia, 2000

WEB PAGE LANGUAGES
English and French

Conceived and written by Joseph Maglitta, Designed by David Flaherty

INFO '96
Sports stat stream. Web surfers can peek into the main information warehouse used on-site by athletes, coaches, volunteers and members of the media. There they can gorge on athlete bios, medal standings, rules, schedules, 100 years of Olympic state and "near-real-time" results.
HOW IT WORKS: Data travels via Token Ring LAN from PC-OS/2 clients to AS/400 servers at 30 venues to a System/390 running DB2, then back to an AS/400 server and the SP2 for distribution to PCs, kiosks and the Web. A one-way firewall writes data to a secure DB2 database on an SP2.

INTERNET SERVERS
One RS 6000 SP2 scalable parallel processor with 52 nodes in Southbury Conn

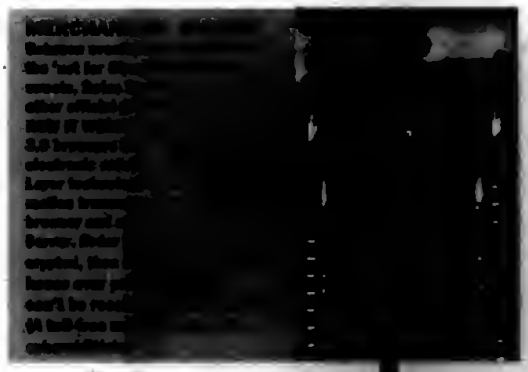
SECOND SERVER
One RS 6000 SP2 with 16 nodes in Hawthorne N Y
Each node has 250M to 512M bytes of memory and 4G bytes of DASD Systems have Asynchronous Transfer Mode connections

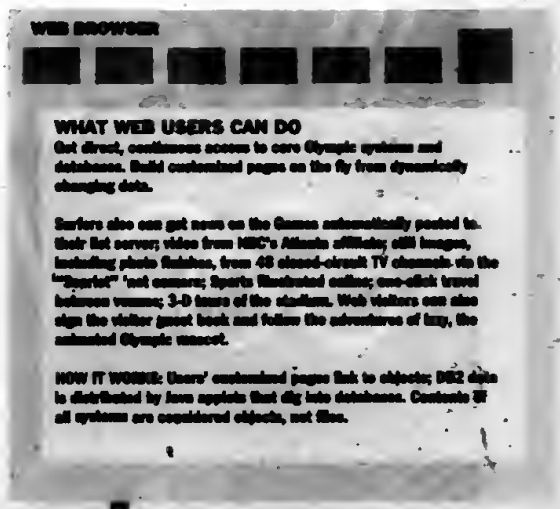
WEATHER SYSTEM
Want to know the weather for two kilometers around Atlanta stadium? A regional forecasting system developed with the National Weather Service crunches a six-hour forecast in 60 minutes.
HOW IT WORKS: Satellite data for 30 square kilometers around the Games gets fed into a 30-node SP2 running IBM's visualization data explorer.

TECHNOLOGY OPERATIONS CENTER
Mission control. No, you can't surf through here, either. But IBM, AT&T, BellSouth, Kodak, Xerox, Swatch and Sensormatic will keep round-the-clock watch at ACOG's downtown headquarters. Their mission: Find, fix and prevent technology problems at 60 Olympic sites in 11 cities in four states.
HOW IT WORKS: Venue managers take charge of local technology, while staff here does command and control of remote systems as needed. Staff can automate network links and data transmissions. NetView and SystemView provide end-to-end monitoring.

in Cyberspace

The technology behind the '96 Summer Games





KEY

- 256K bit/sec. LINE
- T1 LINE
- 56K bit/sec. LINE
- T3 LINE

FACTS

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Corporate universities:

What you are seeing is the corporate world attempting to build a world-class workforce — **Jeanne C. Meister**

PRO: A skilled workforce

Jeanne C. Meister is president of Quality Dynamics, Inc., a New York-based consulting firm that specializes in corporate university management. She is author of Corporate Quality Universities: Lessons in Building a World-Class Work Force *(Irwin Professional Publishing, 1994). She is also chairwoman of an upcoming symposium, "Corporate Universities Enter the 21st Century," to be held Sept. 9-10 at Motorola University in Schaumburg, Ill.*

In 1990, when I was researching my book, there were approximately 400 businesses in the U.S. that had created internal organizations that fell into the category of "corporate university." Today, that number has grown to more than 1,000. And there are a lot of corporate dollars being invested in these organizations. The average budget is close to $10 million. During the past year, I've seen a significant amount of interest in the corporate university concept from information systems departments in particular.

Why all this activity? For starters, the basic goal of a corporate university is to design training and educatioo that aligns employees with the skill sets required for success within an organizatioo. So what you are seeing is the corporate world attempting to build a world-class workforce linked to the particular strategies, culture and mission of the organization.

Most important, these businesses feel that designing their own educational curriculum is the best way to accomplish this. They feel there's a gap between what is taught in academic institutions and what corporations require from IS employees.

Indeed, when you talk to business managers about their biggest challenges, in many cases, you'll hear them say that current academic curricula simply aren't meeting their needs. IS, in particular, pays an enormous amount of money to contractors for the types of skills they would like to develop in their own people.

So class offerings cover a wide range. Some focus on "core competencies," such as developing leadership skills or understanding corporate values. Others emphasize "horizontal" learning, where marketing employees can learn about technology, for example, and vice versa. And highly specialized "vertical" classes teach specific skills such as C++, systems integration, object-oriented programming or project management.

But the job of retraining and reskilling a workforce shouldn't be done in a vacuum. You need the assistance of an outside learning partner. It's very important for corporate universities to forge partnerships with academic institutions. The biggest reason: Corporate universities are most successful if the "credentials" they provide to students are portable. That is, if completing a class or series of classes results in a certificate or degree that has meaning outside the corporation. When a corporate university is affiliated with an accredited academic institution, the courses make employees more valuable — not just within the organization, but in the job market at large.

IS employees are concerned about building their own portfolio of skills — especially in this era of downsizing. This provides big motivation for employees to get the kind of training that will, in turn, make them better employees. And the corporate university "credentials" — awarded for classes or programs created in partnership with an academic institution — are indeed turning out to be quite valuable outside the corporation itself. We also see trade and industry associations recognizing these types of credentials.

But many corporate universities that want to develop these partnerships are frustrated with the reception they get from academia. Academia have their own, sometimes rigid, way of doing things. They don't always like the idea of partnering with business, even though they have much to gain.

For starters, there's the opportunity they have to increase the number of enrolled students. To create new kinds of degrees. To raise funds from local businesses for research. Such a partnership gets academic faculty into the real world, gets them involved with leading corporations in the area and lets them exchange "best practice" stories and work on research projects of mutual interest.

One of the downsides from a university's point of view is that tenured professors might not be particularly interested in building these kinds of relationships. It could be a significant challenge getting faculty excited. Academics also tend to worry about working too closely with business — how objective will a university be in its research efforts if these alliances are too close?

The corporation is also taking a risk with such a partnership: the risk that it won't get a curriculum tailored exactly to its specific needs.

So, in fact, we are seeing a lot of resistance between the two communities. Therefore, there's a real need to understand how to work together. Precisely because universities and corporations speak two different languages, there's inevitably a period of awkwardness, of trying to understand each other, that can cause a steep learning curve in a collaboration. But it's worth it. ■

Many corporations are playing a lead role in determining IS college curriculum. The immediate result can be better employees. But what about the long-term career impact?

By Alice LaPlante

opposing schools of thought

CON: Too focused on today

William King is a university professor at the Katz Graduate School of Business at the University of Pittsburgh. He is founding president of the Association for Information Systems, a 1,400-member professional coalition of information systems academics, founded last year.

I see several reasons for the proliferation of corporate universities: convenience, cost savings, dissatisfaction with university information technology curricula, a desire to exert greater control over what is taught and a belief that academics don't understand the "real world," among others.

Some of these reasons are well-founded. But I also believe that at least part of the current interest in forming internal universities is derived from the natural tendency of individuals and organizations to indulge in empire-building — when perhaps they should just stick to their knitting.

I don't believe that an alliance with an academic institution is critical. Most academics — including me — can be hired to accomplish specific educational or training goals on an as-needed basis. There are other ways to engage the talents of academic personnel without a formal alliance.

The major risk for the company is that control of content will be lost, and they won't get what they want. The major risk for the university is that they will "sell out" to gain much-needed revenue and get themselves associated with poor-quality programs. And each of these things can happen incrementally despite the best intentions of both sides.

Another risk — and this is an important argument — is close collaboration. There's a necessary tension that should exist between IS practitioners and academics — a tension that is good for the IS world. For example, corporate people usually want training and education to focus on things that are directly relevant and immediately applicable. Academic programs aren't necessarily good at doing that, and they shouldn't have that as their primary focus.

The goal of an education is to make people better thinkers, problem-solvers and decision-makers. It isn't to train students in the latest management fad or the latest technology. Universities must focus on the long-term career needs of their IS students. And good academic programs are rigorous as well as relevant. In addition to teaching students how to think effectively, they emphasize theories, rigorous methods and the assumptions that underlie various management tools and techniques.

For example, a company embarking on creating a client/server architecture might understandably wish to offer a course on that topic. A university class on client/server would probably begin by focusing on a variety of architectures, how they compare, what the costs and benefits of each are under various contingencies and how the decision involving selection of an architecture should be formulated. It would provide hands-on experience only to the degree that it is needed to truly understand the broader issues. The company, having made the decision to go client/server, would probably see much of this as too theoretical or insufficiently applicable.

I don't want to seem unconcerned with the practical side of technology. But what usually differentiates corporate universities from academic programs is that academia is more focused on the long term and more concerned with broader issues than day-to-day kinds of things.

Corporations should form their own universities only when it is clearly superior to other alternatives — some of which may require some innovation to develop. Otherwise, the next CEO will come in and cut out what may be perceived as unnecessary fat, and both the company and its related universities will have lost. ■

LaPlante is a freelance writer in Woodside, Calif.

The goal of an education isn't to train students in the latest management fad or the latest technology

— William King

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Associate of Arts degree in computer science, 5 years of directly related experience working extensively with RPG applications in an IBM AS/400 environment, and experience with HBOC 4000 Series HPMS and/or Software 2000 financial systems required. Experience interacting with a multiprotocol network environment and a B.S. degree are desirable.

Programmer Analyst

Ideal candidate will formulate/define system scope and objectives through research and fact-finding to develop or modify complex information systems. Responsible for coding, testing, debugging, documentation, implementation and ongoing support of direct and user applications that use AS/400 operating environments, including OS/400 CL or RPG programming language.

Associate's degree or certificate of completion from a technical curriculum, or equivalent experience required. Must possess two years of medical and/or business applications systems development in a traditional centralized application platform environment, and working knowledge of OS/400 development. Must be proficient in using OS/400 CL and RPG/IV. Five years of applications systems development in a healthcare environment with heavy concentration in the design, development and support of AS/400 financial and/or clinical applications is desirable.

In New Mexico, you can enjoy an abundance of recreational and cultural activities and a mild four-season climate. We offer a competitive salary and comprehensive benefits package. Interested candidates should forward qualifications to: **St. Joseph Healthcare System, Human Resources Dept., P.O. Box 25565, Albuquerque, NM 87125; (505) 344-2771.**

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9

SENIOR SOFTWARE ENGINEER - DATABASE ENGINE SPECIALIST. Develop and implement designs, hierarchies, memos and table forms utilizing advanced knowledge of graphics software engineering concepts. Determine recommend and plan the layout of computer and peripheral equipment to be installed or to modify existing equipment utilizing knowledge of programming languages. Create utilities to manage database configuration, administration, and tuning. Construct, maintain tune and size production and development databases. Work on complex designs and coding systems, in particular for porting a major CASE/Development tool (IEF) from Oracle to Informix. Analyze software requirements to determine feasibility of design within time and cost restraints and formulate and design software systems using scientific analysis and mathematical models to predict and measure outcomes and consequences of design. Perform bench marks against the corresponding Sybase, Oracle and DB2 version of the software. Develop and direct software system testing procedures, programming and documentation, in addition to consulting with customers concerning maintenance of software systems. Plan and prepare technical reports, memoranda and instructional manuals relative to operation of the program in the system. Requires a Bachelor's degree in Computer Science, Engineering or their equivalent and one year experience in job offered or one year related computer software systems analysis experience. Background must include at least one year experience in the following: management of software projects using RDBMS such as ORACLE and INFORMIX on UNIX platforms, and distribution applications. 40 hour work week. $50,000-$75,000 per year. Apply at the Texas Workforce Commission, Dallas, Texas or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701. Job Order # TX7956211. Ad Paid by an Equal Opportunity Employer

Programmer Analyst (2 openings) - Plan, develop, test & document computer programs, applying knowledge of programming techniques & computer systems; evaluate user request for new or modified programs, determine feasibility, cost & time required, compatibility with current system & computer capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps required to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by computer. The intended responsibilities include working on IBM-PC/MS Windows platform using a wide variety of hardwares, softwares & languages including, but not limited to: SDK programming, IBM 3090 MVS/ESA, FOUNDATION CASETOOL, VS COBOL II, REXX, VSAM IE DB2, CICS, CATS, INFRONT, DCI, INTERTEST, XPEDITER, JES/JCL, SMR/JMR, CA-7, REQUESTOR, SPUFI, QMF, FILE AID, TSO/ISPF, EDSF, ENDEVOR, LIBRARIAN, DOCUTEXT, INFOMAN. Reqs: Bachelor's in Computer Science, Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or its equivalent in ed. & exp. & 2 yrs. exp. in job offered or 2 yrs. exp. in related occupation as a Programmer, Programmer Analyst, System Analyst, Software Engineer or Consultant. Will accept 3 yrs. of college ed. plus 3 yrs. exp. in the job offered or in a related occupation in lieu of the required ed. & exp. Must have some related exp. which included working on IBM-PC/MS Windows platform using SDK programming. $42,940/yr., 40 hrs/wk, 8:30-5p, M-F. Send resume to 7310 Woodward Ave., Rm 415, Detroit, MI 48202. Ref. No. 70666. Employer Paid Ad

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The City of Saginaw, Michigan is looking for an individual to provide the necessary planning, direction, operation, maintenance and administration of the TOTAL City-wide computerized information services. This includes the Public Utilities Department's information and computerized instrumentation and control system. The position reports directly to the Deputy City Manager. There is also a direct relationship to the Assistant City Manager for Public Utilities with regard to that department's automated systems. The position directly supervises the current Management Information staff and works in conjunction with two Instrumentation and Control Technicians out of Public Utilities.

REQUIREMENTS: Must possess a Bachelor's degree in computer science; experience in design, operation and maintenance of Novell, Windows NT LAN/WAN systems; experience in Windows for work groups and Windows 95 and NT work station operating systems, minimum of five years of experience in current hardware/software and industrial process controllers technology is required; must have a proven track record (minimum of five years) in the management and supervision of a Management Information Center; experience in management of VAX/VMS systems, DECNET, VMS/SNA, PATHWORKS; experience in commercial and industrial networking methods and management; experience in programmable Logic Controllers and ladder logic programming language; experience in systems analysis in the areas of data processing and industrial controls; possession of excellent verbal and written communication skills; must become a City of Saginaw resident within 90 days from date of hire. Qualified applicants will be invited to an oral interview. Apply in Employee Services, Room 202, City Hall, 1315 S. Washington Ave., Saginaw, Michigan 48601 on or before 5:00 p.m., Friday, August 30, 1996.

TECHNICAL OPPORTUNITIES

VHA Inc., is a performance improvement company serving 1,300 not-for-profit health care organizations. VHA provides information, products and services to help these organizations improve community health, clinical quality and operational efficiency. We are currently seeking qualified individuals for our corporate headquarters located in Dallas, Texas.

LAN/WAN CONSULTANT

This position manages all areas of PC and LAN hardware/software technical support for the Regional and Divisional offices of VHA. 3+ years experience installing, configuring and supporting Novell NetWare 3.X networks, Novell GroupWise, Windows 3.X, Microsoft Office and WordPerfect 6.1 (NetWare 4.X & Windows 95 a plus). Skills must include knowledge in the area of WAN, mainframe, and midrange connectivity including basic router configuration, TCP/IP, IPX/SPX and NetBios protocols. Requires 50% travel within Continental U.S.

LAN SPECIALIST II

As a LAN Specialist II, you will assist in multiple areas of LAN support. You will also serve as a technical consultant for PC and LAN hardware/software. Experience in Cheyenne ArcServe and Pallindrome required. You must also be familiar with midrange/mainframe (AS/400, RS6000 and ES9000) connectivity, remote telecommunications, and various protocols (i.e. TCP/IP, SNA, IPX/SPX, AppleTalk). 3 years experience of PC support required.

Degree/equivalent or experience may be substituted on a years-for-years basis and relevant experience will vary according to the position.

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Database Analyst: Develops, analyzes and modifies software systems using FoxPro and related graphic user interface tools including use of Visual C++ as an object oriented programming language. Designs and implements visual applications for the clients to allow access to various modules of FoxPro relational database. Develops FoxPro related software applications in LAN environment, including installing and modification of management information systems. Performs data conversion among multiple databases installed on multiple platforms and insures integrity of data as well as insures access to data, all which are installed in a network environment by establishing control systems. Requires Master's Degree in Computer Science. Also requires one year experience in the job offered or one year experience as a Software Engineer II experience in related field. Entire experience must include the development of FoxBased related software applications in LAN environment including installing and modification of management information systems to manipulate data among multiple databases installed on multiple platforms to insure integrity of data as well as insures access to data by establishing control systems. Hours: 8:30 a.m. - 5:00 p.m., 40 hours per week at $40,500.00 per year salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Bruce Levin, President, Peoples Interface Inc., 400 Skokie Blvd., Suite 540, Northbrook, IL 60062. No calls.

Computer Consultant. 40 hr/wk from 9am to 5pm. Salary at $45,000/yr. Design, develop and implement applications on client-server platforms with GUI interfaces. Development of commercial application software systems and rpts; estimation systems using object oriented technology in a Windows environment. Use of client server and object oriented technology with the goal of taking enterprise wide computing system and making it user friendly and bringing it to desktop level. Hardware: IBM compatibles. Use of MS Windows with Lantastic NOS, MS C/C++, MFC, SDK, MSExcel, ®Risk, Paradox 3.5, MSAccess and any other hardware and software that assignment demands. Requires B.S. Degree with Electronics/telecomm. Eng. or Comp. Science as major or foreign equiv. and 6 mo. experience in job offered or as Programmer/Analyst or Software Developer including design and implementation of transaction-oriented client-server applications, MS Windows 3.1 with Lantastic NOS version 5.0, MS C/C++7.0, MFC 1.0, SDK, MSExcel 4.0, ®Risk, Paradox 3.5 and MSAccess 1.0. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street/3 South, Chicago, Illinois 60605. Attention: Leila Jackson, Reference #V-IL-13935-J. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

SYSTEMS ANALYST to provide specialized computer consultancy service to analyze, design, develop, test and implement OS/2 client server systems applications on IBM 3090 mainframe, RS-6000 and personal computer hardware with large relational databases, perform object oriented design in client server environment and architectural design using relational database DB2, CICS, XDB, BBx, Oracle, OS/2, C++, Motorola, Data and communications, and operating system software (IBM Communications Manager, APPC, APPN, DDCS/2, CICS). Require B.S. in Computer Science/Electronics Engineering and two years experience in the described job duties as Systems Analyst or as Software Engineer. Experience must include client server applications and object oriented design using DB2, Oracle, OS/2 and C++ development, of which one year must be in the utility industry. Salary $48,000 per year. 8 am to 5 pm, M-F. Send resume with Social Security number to: Indiana Dept. of Workforce Development, 10 N. Senate Avenue, Indianapolis, IN 46204-2277. Attention: Sean Blancaflor, ID #3378706.

Programmer/Analyst sought by information management consulting firm in Dallas, TX to work at job site in Westlake, TX & subsequent client sites in TX. Participate in design & development of computer software applications or modules, including database & graphical user interface (GUI) design, which incorporate client/server architecture & Oracle relational database management systems on UNIX operating system. Use object-oriented design methodologies, Oracle Reports & Oracle Forms, Visual Basic, Microsoft Access, C++ programming language, & PL/SQL stored packages & procedures to create software applications &/or modules. Enhance & modify existing applications & provide training & support to clients. Requires bachelor's, Computer Science or related field; 2 yrs. experience designing &/or developing software modules or applications, including database & GUI design which incorporate client/server architecture & Oracle relational database management systems, using object-oriented design, Oracle Reports & Oracle Forms, & C/C++ computer languages; 3 mos. experience writing procedures & stored packages in PL/SQL. Position may require relocation to another client site in Dallas, TX area. $57,000/yr. 8am-5pm, M-F. Apply at Texas Workforce Commission, Dallas, Texas or send resume to 1117 Trinity, Room 424T, Austin, Texas 78701. JO#TX7856042. Ad paid for by an Equal Opportunity Employer.

Database Analyst. Creates, designs, modifies and develops relational databases in a client/server environment to allow access of data in a multi-platform, multi-user network environment. Tests, modifies, and implements relational database using MS Access relational databases and implements various modules for end user requirements using Visual Basic including implementation of financial functions for financial calculation of data to display appropriate calculated data to end users. Insures integrity of relational databases in an Oracle database system based in a client/server environment to insure data acquisition and integrity of data which is processed within each database including data validation. Performs data retrieval, editing and manipulation of new data using PL/SQL and insures restricted data access by implementing network APIs. Requires Master's degree in Computer Science or Systems Engineering. Also requires one year experience in the job to be performed. Hours: 9:00 a.m. - 5:00 p.m., 40 hours per week at $50,000.00 per year salary. Must have proof of legal authority to work permanently in the United States. Please send resume to Edward L. Beundy, Director of Staffing, DHS & Associates, Inc., 10255 West Higgins Road, Rosemont, Illinois 60018. No Calls.

Software Engineer/Consultant (San Antonio, TX & other client sites) Design/implement interoperability tools for data migration & real-time transaction interfacing applics. between relational database & legacy system networking. Analyze/design/dvlp/implmnt/test s/ware applic systms using UNIX & Windows oper.g systms. Provide reqd consultancy, prgrming & training servcs to clients. Envrnmnt: Oracle & its dvlpmnt tools (SQL*Forms, SQL*Plus, SQL*RPT, PRO*C, SQL*Net); Informix & its components (OnLine engine, I/4GL, ESQL/C, ISTAR i/NET); C & C++; Masters-Comp Sci or Engg + 2yr exp in job offd or Bachelors + 5yr exp. $42K/yr, 40hr/wk, 9a-5p. Must have proof of legal auth to work in US. Apply at Texas Workforce Commission, San Antonio, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701. JO# TX7856055. Ad paid by an Equal Opportunity Employer.

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PROGRAMMER/ANALYST. Technical support for production systems for warehouse management and distribution. Systems analysis and programming support. Systems supported: UNIX, Oracle and Visual Basic. 40 hours per week, 9AM-5PM. $76,960 per year. Requires two years' experience as programmer/analyst or computer software consultant. Two years' experience must include 1) six months' experience with client/server technology and 2) six months' experience with bar coding technology and Radio Frequency Terminals. Requires Bachelor's degree or equivalent in Computer Science or Electrical Engineering. Apply at the Texas Employment Commission, Houston, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. JO #TX7504834. Ad Paid by Equal Opportunity Employer.

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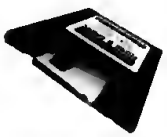

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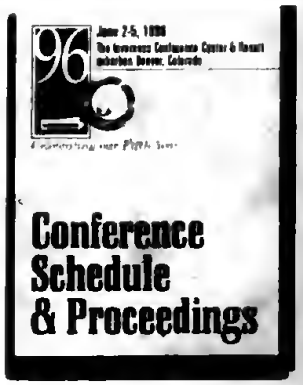

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2. SENIOR SYBASE ADMINISTRATORS: Minimum 8 years experience on UNIX SunOS/Solaris of which minimum 6 years must be in Sybase administration on UNIX. Should have worked extensively on Sybase 10.x and 11. VLDB administration. Must possess DBLib, Open Server, CTLib programming, C programming and Networking using TCP/IP experience.

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***OTHER OPPORTUNITIES** - SAP ANALYSTS, PROGRAMMER ANALYSTS, PROJECT MANAGERS & SR. PROGRAM MANAGERS, NOC MANAGERS, EDI/EC ANALYSTS, and CUSTOMER SUPPORT REPRESENTATIVES.*

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The United Nations High Commissioner for Refugees (UNHCR), with headquarters in Geneva, Switzerland, and offices throughout the world, seeks an experienced **SENIOR INFORMATION SYSTEMS OFFICER (PROJECT LEADER)** for its Information and Computer Systems Section in the Division of the Controller and Management Services, based in Geneva.

UNHCR plans to implement a new large-scale computer system using current advanced technology. This post requires extensive experience in all aspects of project management (planning, budgeting, monitoring) and a proven track record in the successful implementation of at least one large-scale integrated computer system using client/server architecture and large-scale relational database (preferably) on a Unix platform using Sybase).

The incumbent will report to the Head of Software Development and in turn to the Deputy Director of the Division of the Controller and Management Services.

Minimum Requirements: University degree in Computer Science, Statistics, Economics, Mathematics or other relevant discipline, with a minimum of 12 years professional EDP experience, of which at least 6 years must be at the Project Leader level. Considerable experience at an increasing level of responsibility in the field of system innovation can substitute for a formal degree.

Languages: Fluency in English and working knowledge of French is essential. Knowledge of other languages an advantage. UNHCR offers competitive international salaries, benefits and allowances.

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UNHCR encourages qualified women to apply. Because of the number of applications expected, acknowledgments will only be sent to short-listed candidates under serious consideration.

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We have several openings for networking professionals who have a record of success with multi-protocol networking (MPN) technologies. We'll rely on you to review customers MPN requirements, build router configurations, and implement, test and verify end-to-end connectivity. Your credentials must include a BS in CS, TC or MIS, at least 3 years' hands-on experience in a multi-protocol environment, and strong skills in the TCP/IP protocol suite, including RIP, OSPF and BGP4 routing protocols. Proven team and communication skills and the ability to accommodate a flexible work schedule are essential; knowledge of Cisco and IBM routers and experience with Bay Network and other vendor routers are desirable.

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Advance your experience monitoring SNA and multi-protocol (MPN) resources using various network management tools. You'll respond to alerts and alarms, implement recovery actions and document all problem management system network activities; and manage problems from initial intervention to final resolution. This work will involve a high degree of interface with customers and vendors and will require excellent communication skills. To qualify, your background also must include SNA, multi-protocol, LANs, WANs, T1/T3, Netview, AIX/UNIX and, ideally, an Engineering, Telecommunications or Computer Science degree.

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Consultant, 40hrs/wk., 9am - 5pm, $40,000/yr. Design, develop, implement & test software applications for decision support system using multi-layered client/server architecture. Database design & application development. Tools: ORACLE, DBMS, Forms, SQL Reports, Windows NT,, Pro C, PL/SQL, UNIX, M.S. in Computer Science as well as 1 yr. experience in job offered or as Research Engineer required. Previous experience must include: database design, application development, ORACLE, Pro C, SQL, PL/SQL, UNIX. Must have proof of legal authority to work permanently in the U.S. Send resume to: Joan Banti, The Sedona Group, 812 Valley View Drive, Moline, IL 61265, (309) 797-9785.

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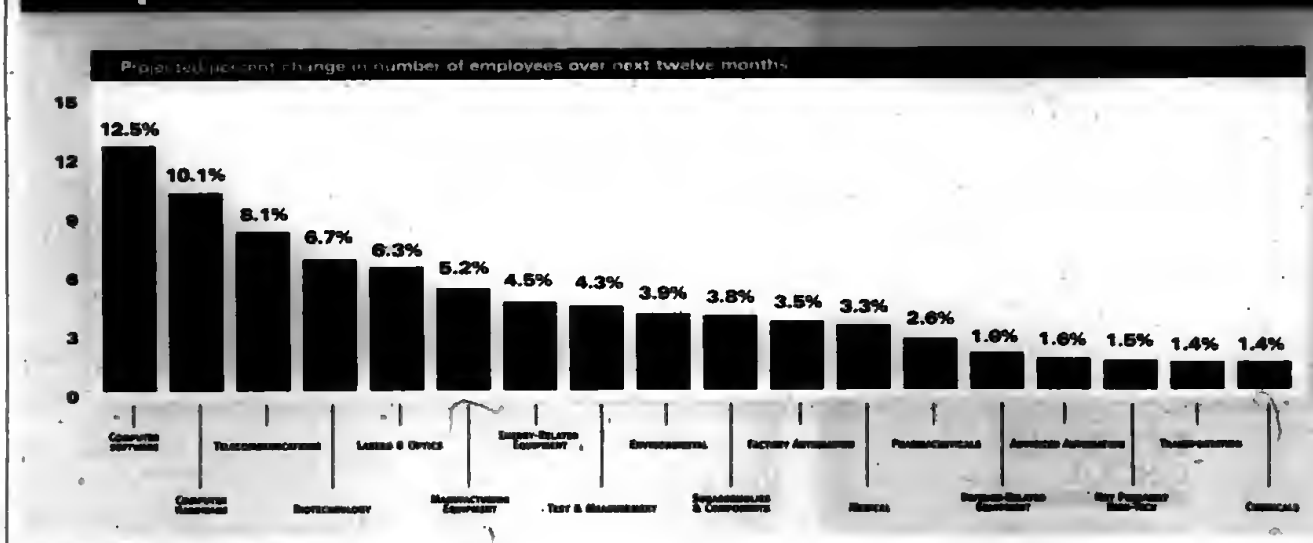

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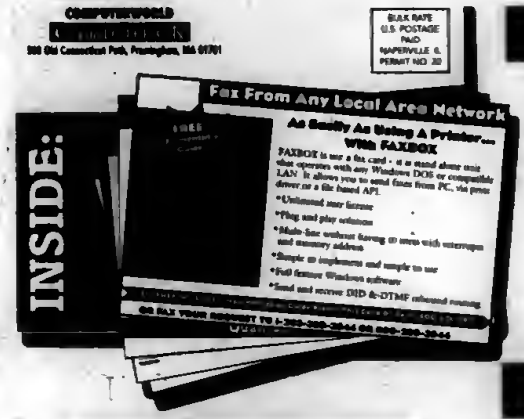

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Marketplace

Through heat, dirt and spilled coffee . . . rugged notebooks DELIVER

By Lynn Haber

PREPARE FOR THE WORST. That's the credo of users whose work environments are just too demanding for most off-the-shelf notebook computers.

When shopping for ruggedized portable devices, those users first consider what the products must endure: heat, cold, moisture, vibration, shock, electromagnetic interference and air contaminants such as dirt, dust and grime.

A handful of vendors caters to the niche market of rugged notebook computers: Amrel Technology, Inc. in Arcadia, Calif.; Badger Computers in Tampa, Fla.; Dolch Computer Systems in Fremont, Calif.; Fieldworks, Inc. in Eden Prairie, Minn.; Husky Computers, Inc. in Clearwater, Fla.; Itronix in Spokane, Wash.; and RDI Computer Corp. in Carlsbad, Calif. Those manufacturers cater to users in industries such as automotive, chemicals, manufacturing, marine, medical, military, petroleum and transportation.

Heavy use

Rugged notebook manufacturers like to differentiate their products from traditional notebooks according to their usage, which puts many more duty cycles on a machine. Their computers tend to be used all day, every day — picked up, put down, toted in vehicles and so on.

Sears Home Services, a division of Sears, Roebuck and Co. in Hoffman Estates, Ill., is rolling out 12,000 rugged notebook computers to field service technicians nationwide.

"For our workers, a notebook computer is a tool, not a fashion accessory," says Lawrence Finney, senior systems director.

Finney's primary criterion for a notebook computer was an ability to withstand being carried in a truck on city streets in a range of temperatures — from –40 degrees Fahrenheit in Minnesota to a sweltering 100-plus degrees F in the South.

"Under these circumstances, you deal with condensation, and the notebook has to be tightly sealed," Finney says.

Vendors such as Itronix, for example, seal all ports as well as the case because condensation and other contaminants can cause a circuit to short or a board to fail.

Temperature fluctuations also have a big impact on the performance of the screen, or monitor. At above 115 degrees F, the material in an LCD screen turns black. At temperatures closer to 180 degrees F to 190 degrees F, the screen can be damaged. Traveling down the thermometer, the screen dims and works slower below 32 degrees F because the liquid in the screen freezes. At –30 degrees F to –40 degrees F, permanent damage can occur.

Damage to the notebook computer as a result of being dropped was the primary concern at Northwest Airlines, Inc. when officials decided to evaluate a diagnostic and troubleshooting software application for the company's aircraft mechanics. "We knew from the start that we needed a rugged portable notebook computer," says Mark W. Lowry, senior business analyst in the technical operations, automation and technology management group at Northwest in Minneapolis.

Northwest is testing the Boeing Co. software on its 747 Model 400 airplanes and has deployed two rugged notebook computers. The mobile units, which are carried in to the aircraft's cockpit, were designed to read faults off the airplane's computers.

The notebooks can access maintenance manuals, a fault isolation manual, an illustrated parts catalog and other information via CD-ROM. Mechanics have a wealth of data at their fingertips, and they can order parts and get the aircraft repaired faster.

Another concern for Lowry was the ability of the rugged notebook to run off aircraft power, which is 400Hz at 115V, not 60Hz, the normal power range. "A traditional notebook computer would fry in these conditions," he says. The Fieldworks rugged notebook features a universal adapter that suits the aircraft environment.

Rugged notebook computers were designed to be used in the field, but they're not as streamlined as their traditional notebook counterparts. "That's because the carrying case tends to be bigger and because the product is shock-mounted and rubberized," says Randal Giusto, manager of mobile computing research at International Data Corp. in Framingham, Mass.

Overall, the trend among rugged notebook computer vendors mirrors that of mainstream notebook vendors: faster processors, multimedia capability, wireless capability and modularity. ■

Haber is a freelance writer in Norwell, Mass.

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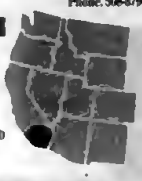

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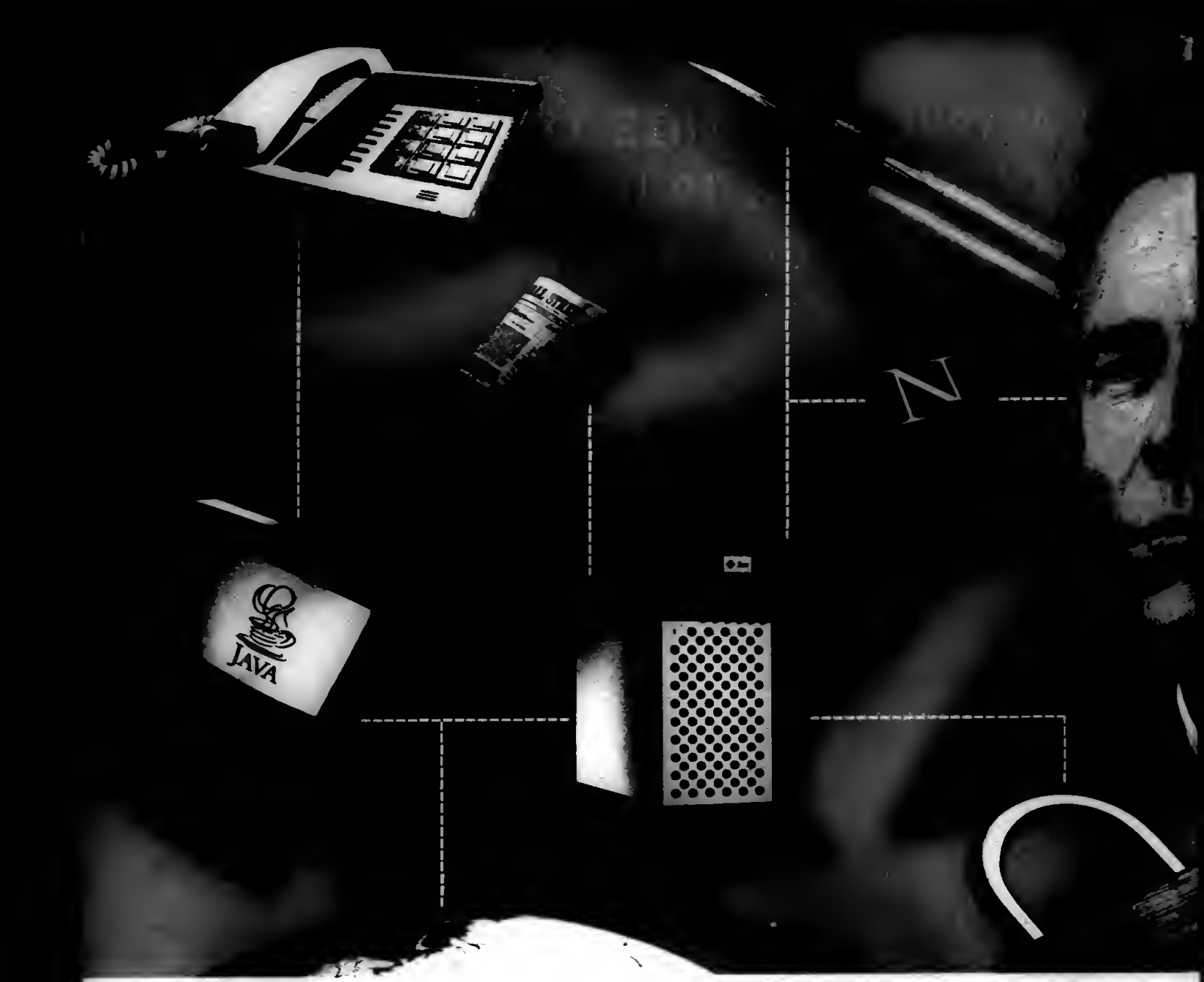

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Playing the open market

You may dream of getting rich on stock options when your employer goes public, but be prepared for a little squeeze first

By Julie Bort

The initial public offering. It has created multitudes of millionaires — and a few billionaires — at companies such as Microsoft Corp. (Nasdaq:MSFT) and, more recently, Netscape Communications Corp. (Nasdaq:NSCP). Perhaps you dream of the same thing happening when your company takes the plunge into the public market.

But going public is not all sugar and stock options. The truth is that the IPO process for employees can be as stressful as it is promising. On the positive side, stock options take on a whole new meaning when a company goes public.

"The problem you have with private companies is that it's hard to know how much a stock is worth. With a publicly traded company that's trading on Nasdaq or the New York Stock Exchange every day at $20 a share, you know its value," says Mark Sherman, a principal at Robertson, Stephens & Co., a San Francisco investment bank.

Stock options allow employees to purchase stock at a predetermined price. During an IPO, that price is often the opening price. This can translate into big bucks if the stock hits it big.

On equal par with personal wealth, success on Wall Street can feel like a validation of your work, contends Brendan Eich, author of Netscape's JavaScript and a veteran of IPOs at both Netscape and Silicon Graphics, Inc. (NYSE:SGI).

"There was a little more excitement to be here" during the early days of Netscape's IPO, Eich says. "I was working hard on Netscape 2.0, so my hours were heavy anyway. But suddenly, we were getting a lot more attention from outside the market, from the world."

On the other hand, going public can be stressful. From the moment a company decides to go public until 25 days after it starts trading — known as the quiet period — employees are forbidden to disclose anything that might influence how the stock might trade. It is also a time when management is preoccupied and frequently absent, and when lawyers, accountants and underwriters are combing through every aspect of the company's existence.

Such scrutiny leads some companies to order "face-lifts" in an attempt to improve the IPO outcome. This was the case for one high-tech start-up that is currently in its quiet period.

"[We took] a 7% pay cut," says one technical support manager at the company. "They also squeezed office space in half, so many people shared an office where before they had a single. It was an unpleasant time to be part of the company. A lot of people left when the squeeze was on. Since it is a rather small company, everyone feels the pain when an individual leaves. [But] we were promised profit sharing at the end of 1996. We'll see. If it happens, we could get double our 7% cut during the first quarter of 1997. I also have plenty of stock options. It appears the direction has focus now, and it's very exciting. I'm planning to stay."

Such face-lifts are frowned upon by investment brokers.

"It's never a good idea to window-dress or do temporary measures to make the company look like it's ready to go public," says Doug Baird, principal of equity capital markets at Alex. Brown & Sons, Inc., an investment bank in Baltimore. "But there could be a lot of reasons for a company to specifically take an action like a pay cut. A lot of technology companies want to offer employees stock options, and there's a compensation expense associated with that."

Still, a majority of employees don't face these extremes. For many, an IPO is an exciting time in which their hard work is validated and rewarded.

Bort is a freelance writer in Dillon, Colo.

Investor's bookshelf

Investing by the Stars: Using Astrology in the Financial Markets
By Henry Weingarten (McGraw-Hill, New York; 233 pages; $24.95, hardcover)

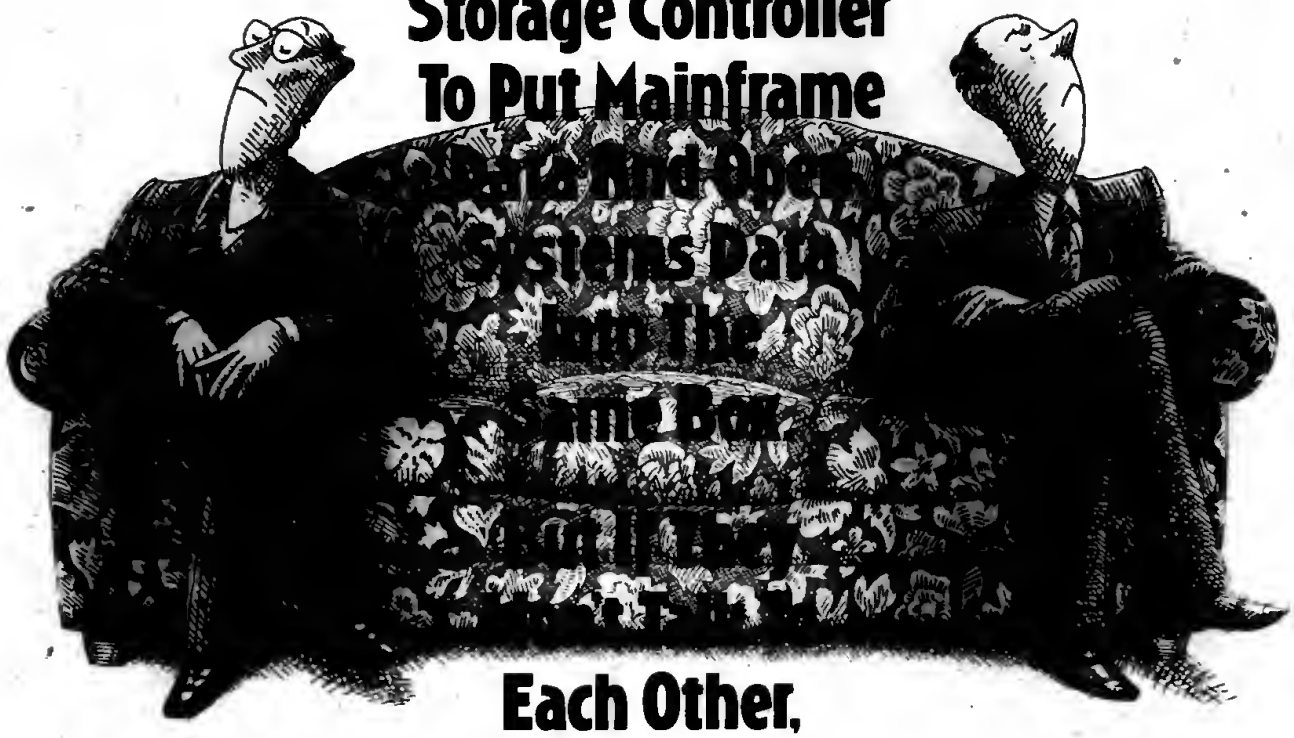
[redacted]

Some people predict the stock market by the level of hemlines or sunspot activity, so why not take an astrological approach to the market? I tried to keep an open mind when reading this book, written by a former computer entrepreneur who now runs his own astrologically guided money management firm. The book opens with a somewhat convincing argument that astrology, when used in conjunction with traditional stock-picking methods such as technical evaluation and fundamental analysis, can be a useful tool for investors. But it quickly degenerates into an esoteric discussion of planetary patterns and stock market activity that challenges the attention span of anyone who isn't both an astrologer and a Wall Street analyst. What's the book's big prediction about the future of the stock market? That Wall Street will begin openly hiring financial astrologers. Don't hold your breath.

The Internet Report
By Mary Meeker and Chris DePuy (HarperBusiness, New York; 303 pages; $20, paperback)

Having found yet another way to make money off the Internet craze, Morgan Stanley has published this collection of in-house research for the retail market. It includes chapters on features and use of the Internet and a chapter on software; a competitive analysis of some of the players; a glossary of Internet terms; and a list of cool sites. In an attempt to guide the wide range of readers that might pick this up in their neighborhood bookstore, the report offers a "trail map," similar to those used for skiing. The map recommends which chapters to read depending on your level of Internet savvy: novice, intermediate, expert and double diamond. The report gets a bit carried away with its own enthusiasm for the 'net; given it is geared toward the general public, a bigger dose of skepticism and a warning about the dangers of investing in Internet stocks seem warranted. Also, it is fast becoming outdated – having been published in April based on research completed in February, it is already more than two years old based on "Netscape years." – *Tam Harbert*

You Want A New Storage Controller To Put Mainframe



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The Week in Stocks

Gainers

PERCENT

Software Publishing Corp.	16.3
Softkey International Inc.	11.8
Exabyte	11.7
Truevision Corp.	7.0
Telebit Corp.	6.2
Microcom Inc.	5.5
McAfee Associates(JV)	2.9
4th Dimension	2.1

DOLLAR

Softkey International Inc.	3.25
McAfee Associates(JV)	1.50
Exabyte	1.50
Ascend Communications	1.00
Telebit Corp.	0.69
FORE Systems Inc.	0.50
MCI Communications Corp.	0.50
BGS Systems Inc.	0.50

Losers

PERCENT

Computer Horizons	-35.4
Computervision Corp.	-33.9
Business Objects	-31.3
Broadcast Technology	-27.5
Control Data Systems Inc.	-24.7
Systemsoft Corp.	-24.0
TriCord Systems	-23.1
Analog Devices Inc.	-20.5

DOLLAR

Computer Horizons	-3.00
Hewlett Packard Co.	-1.63
US Robotics	-1.31
Systemsoft Corp.	-1.13
Netscape Comm. Corp.	-1.75
Newbridge Networks Corp.	-1.25
Sterling Software Inc.	-1.25
Intuit Inc.	-1.25

Industry Almanac

Blast from the past

Some companies, like some Top 40 pop stars, are one-hit wonders: They reach the top of the charts but can't seem to repeat that success. Then they fade into oblivion.

Such a fate would be ironic for **Creative Technology Ltd. (Nasdaq:CREAF)**, a company that was instrumental in bringing music to PCs. The firm had a No. 1 smash with its SoundBlaster, a card that gives audio capabilities to PCs. But since the card was introdoced in 1989, other companies have started to produce knockoffs. Recently, consumers have bypassed Creative Technology's quad-speed CD-ROM SoundBlaster package in favor of faster six- and eight-speed CD-ROM technology.

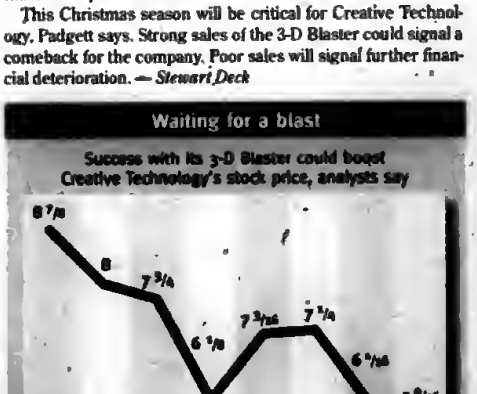
Creative Technology has tried to leverage the Blaster name with products such as PhoneBlaster and InternetBlaster. Neither product has lit up the charts, says Brian Eisenbarth, an analyst at Collins & Co. in Larkspur, Calif. But the company's new graphics accelerator, 3-D Blaster, holds some promise. "They have a solid distribution network, and vendors are developing new graphics products for [3-D Blaster]," Eisenbarth says. Collins & Co. rates the stock a hold.

Although Creative Technology has "good and innovative products," it has had difficulty bringing them to market, says J. D. Padgett, an analyst at Chatfield, Dean & Co. in Denver. He rates the stock "an uninspired hold" because of product delays that let competitors beat 3-D Blaster to market.

This Christmas season will be critical for Creative Technology, Padgett says. Strong sales of the 3-D Blaster could signal a comeback for the company. Poor sales will signal further financial deterioration. — *Stewart Deck*

Waiting for a blast

Success with its 3-D Blaster could boost Creative Technology's stock price, analysts say



Exch	52-Week High	52-Week Low	Stock	July 12 Stock Price	Wk Net Change	Wk Pct Change
COMS	51 6/8	12 1/4	3 COM Corp.	47.25	5.00	10.6
AIT	66.88	44.75	AMERITECH Corp	58.00	1.50	2.5
ARE	22.13	13.25	Amistar Intl. (L)	13.25	-1.25	-8.6
APTS	17.13	7.75	Apertus Tech.	3.13	0.38	10.7
T	68.88	31.38	AT & T	58.75	0.38	0.9
ASND	71.75	13.50	Ascend Communications	57.75	1.00	1.8
BNYN	13.63	8.00	Banyan Systems Inc.	8.88	-0.38	-5.2
BAY	50.00	24.63	Bay Networks Inc.	25.00	1.75	4.9
BEL	80.38	43.50	Bell Atlantic Corp	61.25	2.50	3.9
BLS	43.88	31.00	BellSouth Corp	41.38	-1.88	4.3
BRXT	32.75	6.63	Brooktrout Technology	17.75	6.75	27.6
CS	87.75	48.63	Cabletron Systems	65.38	4.13	5.9
CSCC	74.75	13.13	Cascade Communications	60.00	1.25	1.8
CGBM	29.13	12.88	Centigram Communications (L)	13.13	1.50	10.3
CSCO	61.75	24.25	Cisco Systems Inc.	54.00	2.75	4.8
CLIR	11.38	4.50	Compression Labs Inc.	5.75	0.44	7.1
CMNT	12.75	6.00	Computer Network Tech.	6.50	0.88	11.9
XCOM	14.38	8.75	CrossCom	9.50	1.25	11.6
DIGI	64.00	31.88	DSC Communications	38.13	1.63	5.9
FORE	64.75	15.75	FORE Systems Inc.	34.75	0.50	1.5
GDC	71.63	50.00	General Datacomm Inds.	51.63	3.00	14.7
GSX	61.75	28.00	General Signal Networks	38.25	0.13	0.3
GTE	49.25	33.75	GTE Corp	43.38	1.13	2.5
LU	29.75	29.75	Lucent Tech.	35.88	1.88	5.0
MCIC	33.13	29.88	MCI Communications Corp	26.00	0.50	2.0
MCM	16.38	8.00	MICOM Communications Corp.	12.13	0.00	0.0
MMPI	26.50	10.00	Microcom Inc.	11.00	0.38	3.5
NETM	34.00	9.38	NetManage Inc.	10.38	-0.75	6.7
NTRX	10.88	3.63	Netrix Corp	6.38	-0.63	8.9
NCDI	13.00	3.88	Network Computing Devices	3.88	-0.50	11.4
NWK	62.00	37.13	Network Equipment Tech	37.13	3.88	18.3
NETG	27.63	12.25	Network General	22.75	2.13	8.7
NN	74.25	25.00	Newbridge Networks Corp.	33.75	-11.25	16.9
NT	35.88	31.50	Northern Telecom Ltd. (N)	32.63	3.25	3.6
NOVL	21.63	11.38	Novell Inc.	12.50	1.19	8.7
NYN	59.25	38.50	Nynex Corp	46.13	-3.00	6.1
OCTL	26.25	13.63	Octel Communications Corp	20.75	1.25	5.7
ODSI	43.25	16.75	Optical Data Systems Inc. (L)	18.25	-2.50	12.0
PAC	35.75	25.63	Pacific Telesis	33.88	0.00	0.0
PCTL	66.72	30.75	Picturetel Corp	38.38	-2.25	5.5
PTON	10.75	3.50	Proteon Inc.	3.75	-0.25	6.3
RACO	7.88	3.88	Racotek Inc.	5.00	-0.13	2.4
NETC	30.88	1.81	Netic	6.63	-1.50	-30.5
SBC	80.75	46.50	SBC Communications	49.25	-0.50	1.0
SFA	23.38	11.38	Scientific Atlanta Inc.	11.88	-2.13	14.7
SNVA	87.25	19.38	Sierra Corp	76.75	6.00	7.3
FON	63.50	29.25	Sprint Corp	38.88	1.88	7.2
SMSC	31.50	12.63	Standard Microsystems Corp (L)	12.63	-1.25	12.2
STRN	59.00	38.50	Stratacom Inc.	37.75	0.00	0.0
TBIT	13.88	3.38	Telebit Corp.	11.75	0.69	6.2
USRX	105.30	28.50	US Robotics	23.00	15.13	17.4
USW	48.38	28.38	US West Inc.	31.88	-0.75	0.8
XIRC	12.50	6.88	Xircom	11.38	-2.75	36.3
XYLN	76.88	43.63	Xylan Corp	48.25	-2.25	4.5
AALR	10.38	5.88	Advanced Logic Research	7.00	-0.75	9.7
AAPL	49.88	17.88	Apple Computer Inc. (L)	17.88	-1.75	8.9
ASTA	45.75	6.63	AST Research Inc.	8.00	-0.88	12.7
CPQ	56.75	35.88	Compaq Computer Corp	41.63	-5.38	11.4
DELL	37.75	21.00	Dell Computer Corp.	45.25	3.63	7.4
GATE	61.50	18.00	Gateway 2000 Inc.	50.13	3.81	11.2
HWP	115.38	70.00	Hewlett Packard Co.	78.88	15.63	16.5
MCBI	29.00	8.00	Micron Electronics Inc.	11.63	0.13	1.1
NPNY	75.13	52.75	NEC America	53.25	1.88	1.8
SGI	45.63	21.13	Silicon Graphics	21.63	2.63	10.8
SUNW	67.13	19.75	Sun Microsystems Inc.	51.13	-6.25	10.9
AMH	13.50	6.75	Amdahl Corp	9.25	-0.69	6.9
DGN	39.13	8.13	Data General Corp	10.13	1.63	13.8
DEC	76.50	44.75	Digital Equipment Corp	54.75	-4.50	11.5
IBM	128.88	83.13	IBM	95.63	3.50	3.5
MDDI	20.38	5.25	Meridian Data Inc.	8.13	-0.63	7.2
NETI	7.50	3.88	NetFrame	3.88	-0.38	8.8
SQNT	25.38	16.13	Sequent Computer Sys.	17.13	1.88	13.8
SEQS	30.00	2.44	Sequoia Systems Inc (L)	2.50	-0.50	16.7
SMA	36.13	21.00	Sysatus Computer Inc.	24.75	-3.25	11.6
TDM	37.50	6.38	Tandem Computers Inc.	8.75	-1.25	11.4
TRCD	7.56	2.00	TriCord Systems	3.13	-0.94	23.1
UIS	11.00	5.50	Unisys Corp	6.38	-0.38	5.6
ADBE	74.25	30.00	Adobe Systems Inc.	32.38	3.25	9.1
AMSWA	8.75	3.63	American Software Inc.	4.38	-0.38	7.9
APLX	42.50	8.25	Apollo Inc.	10.75	1.75	3.4
ARSW	82.75	28.75	Arbor Software	46.50	7.50	13.9
ADSK	31.00	24.59	Autodesk Inc. (L)	24.59	-4.93	16.6
BACH	11.88	4.63	Bachman Info. Systems	6.00	-0.75	4.0
BGSS	50.00	29.75	BGS Systems Inc.	30.38	0.50	1.3
BMCS	87.25	31.50	BMC Software Inc.	55.75	2.44	4.2
BOOL	38.75	19.75	Boole and Babbage	22.69	-0.56	2.4
BORL	21.25	6.75	Borland Int'l Inc. (L)	6.75	-0.44	6.1
BOBY	55.50	16.00	Business Objects	22.00	10.00	31.3
CVE	37.88	14.13	Cheyenne Software Inc.	16.75	-2.94	13.0
CDSNF	37.38	9.63	Cognos Inc.	21.50	-3.75	9.5
CA	82.13	37.75	Computer Associates	66.25	-8.19	11.2
CVN	15.50	6.50	Computervision Corp.	6.88	-3.38	32.9
CPWR	40.75	15.50	Compuware Corp	37.50	0.00	0.0
CSRE	32.00	14.63	Consmart Inc.	27.13	-4.38	13.9
COSF	19.50	9.38	Corel Corp	9.38	-1.69	15.2
DWTI	15.75	5.25	Datawatch Technologies Inc. (L)	5.38	-0.50	8.5
FNLC	67.38	20.50	Fiserv Corp (L)	23.36	-1.25	5.1
DDDDF	8.75	3.56	4th Dimension	6.13	0.13	2.1
FTPS	40.63	6.75	FTP Software Inc. (L)	6.75	-0.63	8.5
GSOF	24.50	7.00	Group 1 Software	14.75	0.00	0.0
GPTAE	19.50	8.75	Gupta	8.75	-0.50	30.3
HLNK	28.88	15.88	Hohnbrokered Comm. Ltd. (L)	16.13	-1.63	9.2
HYSW	28.38	9.75	Hyperion Software Corp	10.94	-0.94	7.9
IRIC	16.25	10.00	Information Resources	11.44	-0.19	1.6
INRE	36.75	16.88	Informix Corp	21.88	-2.13	8.9
INGR	20.13	10.88	Intergraph Corp.	11.50	-0.38	3.2
LEAF	13.63	4.25	Interleaf Inc.	6.94	0.44	6.1
ISLI	24.75	11.63	Intersolv Inc. (L)	11.63	-0.38	4.2
INTU	38.25	37.75	Intuit Inc.	37.75	10.25	75.4
LGWX	23.25	10.88	Logic Works	11.50	-1.13	8.9
MAPS	38.75	7.50	Maplinx Corp.	11.19	-0.06	0.6
MATH	8.75	4.63	MathSoft	5.88	-0.63	13.3
MCAF	53.25	32.38	McAfee Associates (N)	52.75	1.50	2.9
MENT	22.88	30.88	Mentor Graphics	13.13	-2.50	16.0
MFGY	31.25	8.25	Micro Focus	11.25	-1.25	10.0
MGXI	38.63	7.63	Micrografx Inc.	13.25	-2.00	14.0
MSFT	125.88	38.88	Microsoft Corp	112.38	-9.13	7.5
ORCL	40.38	23.38	Oracle Corp	37.25	-0.88	2.3
PMTC	49.50	23.75	Parametric Technology	42.25	-1.75	4.0
PARO	14.63	8.75	Park Place Systems Inc. (L)	9.00	-0.50	9.1
PSFT	73.50	28.00	Peoplesoft	65.50	-5.75	8.1
PTEC	20.38	6.88	Phoenix Technologies	13.50	-1.50	8.9
PSQL	30.63	5.13	Platinum Software	9.63	1.19	15.2
PLAT	26.00	11.25	Platinum Technology	12.00	-1.63	11.9
PRGS	38.00	13.50	Progress Software Corp	13.50	-1.50	10.0
RNBO	26.75	10.88	Rainbow Technologies Inc.	17.88	-0.75	4.2
REDB	61.00	24.25	Red Brick Systems Inc.	34.25	-6.25	20.6
ROSS	8.13	2.19	Ross Systems	9.38	-0.50	5.6
SCOC	12.13	5.38	SCO Inc.	6.38	-0.63	8.9
SDTI	109.00	12.63	Security Dynamics Tech	89.25	7.00	7.5
SKEY	81.75	33.38	Softkey International Inc.	23.25	1.75	11.8
SPCO	5.13	3.19	Software Publishing Corp	3.88	0.38	14.3
SQAX	99.75	16.00	SQA Inc.	75.50	2.88	10.2
SOTA	19.75	6.63	State of the Art	13.63	-2.38	13.2
SSW	81.38	38.13	Sterling Software Inc	66.50	-10.75	14.3
SDRC	37.38	19.38	Struct. Dynamics Research	17.75	3.63	17.0
SYBS	38.75	16.50	Symbase Inc. (L)	16.50	1.00	5.7
SYMC	33.25	9.63	Symantec Corp (L)	10.88	-1.56	13.5
SMPS	46.75	23.88	SynOptics	27.75	-1.88	6.3
SSAX	30.63	13.63	System Software Assoc.	13.50	-2.75	16.9
SYSF	60.75	8.75	Systemsoft Corp	10.50	-12.13	24.6
TRUV	10.13	4.63	Truevision Corp	7.63	0.50	7.0
VIEW	17.38	9.63	Viewlogic Systems	12.25	-0.63	4.9
VMRK	21.50	3.75	VMark Software Inc.	9.75	-0.88	8.3
WALK	12.75	5.50	Walker Interactive Systems	9.88	-0.13	1.3
WALL	23.75	13.00	Wall Data Inc.	17.31	-1.94	10.1
WANG	26.13	14.50	Wang Laboratories Inc.	18.88	1.75	8.9
AMER	21.00	12.25	America On Line	17.75	-0.25	1.4
BBN	48.75	18.75	BBN Corp (L)	38.25	-2.50	13.0
CSRV	35.50	16.50	Computervue Corp. (L)	16.50	-6.75	75.4
LCOS	38.75	8.25	Lycos Inc.	8.25	1.50	15.4
NETC	91.50	19.22	Netcom On-Line	22.00	-3.50	13.7
NSCP	87.00	22.88	Netscape Comm. Corp	49.50	31.75	39.2
PSIX	29.88	6.75	PSINet	9.50	-1.63	14.6
QDEK	39.50	7.75	Quarterdeck Corp.	7.75	1.63	17.3
RAPT	38.75	30.25	Raptor Systems	30.75	5.75	21.7
SCUR	66.38	39.00	Security Computing Corp	39.38	-3.75	10.5
SPYG	61.00	14.50	Spyglass Inc	17.88	3.13	34.9
UUNT	38.75	24.25	UUNET Tech	61.75	3.50	5.4
YHOO	43.00	17.50	Yahoo! Inc.	37.38	-3.00	14.6
AMD	36.50	12.13	Advanced Micro Devices (L)	12.13	-1.50	11.0
ADI	30.13	17.50	Analog Devices Inc.	19.75	-5.75	22.5
CHPS	15.88	7.88	Chips and Technologies	8.63	-0.75	7.2
CRUS	61.13	13.63	Cirrus Logic	25.63	-1.31	4.9
CY	27.75	10.00	Cypress Semiconductor Corp	11.25	-1.00	8.2
CYRX	69.75	13.63	Cyrix	17.75	-0.38	2.1
INTC	78.38	49.81	Intel Corp	71.13	-3.75	5.0
LSI	62.50	31.13	LSI Logic Corp (L)	31.13	-4.13	16.3
LSCC	43.00	21.63	Lattice Semiconductor	22.00	-1.63	8.0
MCRL	32.50	11.29	Micrel Semiconductor Inc.	13.00	-2.50	16.1
MU	94.75	21.63	Micron Technology (L)	71.63	-3.61	34.6
MOT	87.50	44.75	Motorola Inc	66.75	9.63	14.7
NSM	33.63	13.50	National Semiconductor	14.25	1.69	9.3
TXN	83.75	42.75	Texas Instruments	45.63	-5.25	10.3
VLSI	39.13	10.75	VLSI Technology	11.13	-2.63	18.1
WWTC	6.88	0.72	Wyse	0.75	-0.13	14.3
WDC	29.00	14.38	Western Digital Corp.	22.00	-2.75	11.1
XLNX	55.50	23.25	Xilinx	38.25	-2.88	9.2
ZLG	54.13	31.38	Zilog Inc. (L)	31.38	-2.63	30.9
APCC	25.25	7.88	American Power Conversion	9.25	1.06	18.1
ADPT	61.50	34.88	Adaptec Inc.	43.13	7.00	16.3
CBEX	33.13	4.75	Cambex Corp.	4.75	-0.88	15.6
CGN	7.75	3.25	Conditronics Corp	4.31	-0.69	13.8
CREAF	14.13	4.75	Creative Technology Ltd., (L)	6.94	-1.88	47.7
DACE	11.88	3.81	Data Race Inc	5.63	-0.94	14.3
DTM	9.38	4.13	Dataram Corp.	6.00	-0.63	9.4
EMC	27.38	11.00	EMC Corp	17.88	1.13	5.9
EMLX	28.50	6.38	Emulex Corp	13.38	-2.13	13.7
ESCC	29.00	14.75	Evans and Sutherland	23.50	0.00	0.0
EXBT	23.75	10.00	Exabyte	14.31	-1.90	11.7
INSF	4.13	1.50	Intelligent Info. Systems	2.31	-0.44	15.9
IOMG	55.31	2.75	Iomega Corp	26.63	-1.38	4.9
IPLS	8.25	3.50	IPL Systems Inc.	3.75	-0.25	6.3
KMAG	37.50	21.38	Komag Inc	22.00	-3.75	14.6
MTSI	24.38	13.25	Micro Linear Systems Inc	16.13	-3.25	7.2
PLAC	34.75	17.38	Peak Technology Group	22.00	-1.00	4.3
PMCI	19.75	6.63	Pinnacle Micro Inc.	7.00	-1.13	13.8
PTRX	25.88	9.13	Printronix Inc.	15.50	-0.63	3.9
AQM	6.75	3.25	QMS Inc.	5.50	-0.75	4.3
QNTM	28.50	13.50	Quantum Corp (L)	13.94	-0.31	2.3
RDUS	12.75	6.94	Radius Inc	7.69	0.00	0.0
SEG	67.75	36.63	Seagate Technology	41.25	-4.13	9.1
STK	44.13	21.75	Storage Technology	35.00	-4.38	11.1
STLC	6.75	1.25	Streamlogic Corp	2.00	-0.50	14.8
TEK	61.88	29.75	Tektronix Inc.	41.13	-1.88	4.4
XRX	54.75	38.50	Xerox Corp	49.63	-2.63	4.8
AMSY	33.38	15.13	American Mgmt Systems	17.25	3.63	33.7
ANLY	43.75	26.00	Analysts Int'l	30.75	0.13	0.4
AUD	43.38	31.00	Auto Data Processing	36.38	2.00	5.2
CATP	38.75	10.38	Cambridge Tech Partners	38.00	2.00	7.3
CEN	54.88	36.63	Ceridian Corp	49.75	2.38	2.7
CDO	28.63	38.88	Comdisco Inc	25.88	1.25	4.6
CMRZ	54.00	11.63	Computer Horizons	18.50	33.00	55.4
CSC	80.75	51.75	Computer Sciences	69.25	4.00	6.2
TSK	31.88	11.25	Computer Task Group	25.13	-3.25	8.2
CPU	48.75	11.88	CompUSA Inc.	31.13	5.13	17.4
CDA1	22.50	6.63	Control Data Systems Inc.	14.88	4.88	24.7
EGGS	14.13	5.00	Egghead Discount Software	9.50	-0.75	7.3
EDS	58.63	41.50	Electronic Data Systems Corp	49.38	-4.29	7.9
IMAC	24.25	9.13	Imacon Corp	16.38	7.63	33.0
INEL	14.63	3.50	Intelligent Electronics	7.25	-2.00	21.9
IKEA	61.75	38.25	Ikea Inc.	36.75	-3.00	7.9
MSEL	8.25	2.25	Marisel	2.94	-0.38	11.3
MICA	30.25	7.75	Micronet Inc.	12.25	-0.75	5.8
PAYX	57.00	23.63	Paychex	47.75	-3.38	6.6
PMS	55.50	42.63	Policy Management Sys.	46.50	-2.75	5.6
REY	56.50	30.13	Reynolds and Reynolds	48.88	-4.13	7.8
SCBI	30.50	16.75	SCB Computer Tech. Inds (L)	16.75	-1.88	6.3
SEIC	36.38	30.75	SEI Corp.	23.63	-0.63	1.8
SMED	72.13	35.63	Shared Medical Systems	57.25	0.00	13.42
SSPE	36.50	17.00	Software Spectrum Inc.	21.75	-0.75	13.91

KEY: (N) = New annual high reached in period (L) = New annual low reached in period

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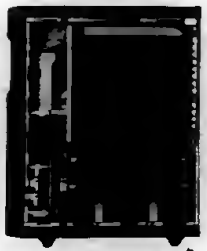

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Clash of the titans

CONTINUED FROM PAGE 1

— show Microsoft making surprising and dramatic inroads against Netscape in terms of the 1997 buying plans of corporate IS.

Netscape isn't "in trouble, but maybe it's coming to earth now that others in the market are waking up," said Jim Crapia, a senior software engineer at Ryder Information System, Inc., the Birmingham, Ala., IS group of rental company Ryder System, Inc.

Thirty percent of the 681 IS executives said they expect Microsoft to be their primary World Wide Web server vendor 12 months from now. Netscape loyalists numbered 28% — making it a virtual dead heat between the two rivals (see chart).

A similar survey on purchasing plans only three months earlier showed Netscape with a hefty 40% to 18% lead over Microsoft.

Netscape disagrees

Netscape officials disputed the survey results, saying their data draws a different picture.

The research "had nothing to do with market share or shipments," said Srivats Sampath, vice president of server marketing at Netscape.

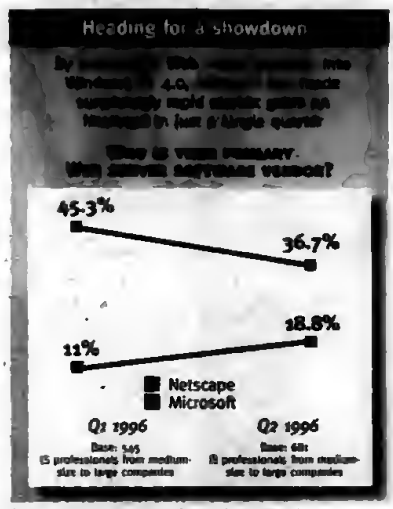
Furthermore, 92 of the 100 biggest U.S. companies run Netscape's browsers, servers or both, he said.

Yet it wasn't any particular Netscape failing that cost it "cyber mind share" among survey respondents, said Rich Mikita, vice president of information management at Computerworld.

"Microsoft is a master at building excitement around its products. They certainly have done that here," Mikita said. "In our four years of IS mind share tracking, the speed of Microsoft's gains are unprecedented for such a strategic product category."

Gigi Wang, senior vice president of communications research at International Data Corp. in Framingham, Mass., said "mind share" research is a valuable tool for indicating which companies are emerging market forces. "But mind share is anyone's game to win," she added. "It doesn't always translate into actual market share."

Among users interviewed about their plans to use Microsoft's Web products, the vendor's integration of its Internet Information Server (IIS) with the Windows NT 4.0 operating system was a prime mover.



Source: Computerworld Research Division, Framingham, Mass.

"If [IIS] comes with NT, you have to think, why not use it?" said Gary Stedman, an information technology planner at Imperial Oil Ltd. Already a big Microsoft shop, the Calgary, Alberta, firm is testing IIS for intranet applications it plans to build this year.

Although freeware servers such as those from Apache and NCSA are widely used on the Internet, most corporate IS shops prefer to deal with commercial vendors, said David Moschella, senior vice president of research at Computerworld.

"It looks like a two-way race between Microsoft and Netscape," he added. "No one else is even close."

Microsoft may be building momentum, but it certainly doesn't have the Web server game sewn up, according to some users.

Not sold yet

Comerica, Inc., for example, will likely make Windows NT a corporate standard in the next year, but it isn't sold on Microsoft's IIS.

"Netscape is the standard for Web technology," said Victor Curatolo, manager of technology planning at Comerica in Auburn Hills, Mich. "But that's a decision we have yet to make."

But for many, Microsoft's bundling arrangement can't be beat.

"Let's put it this way," said Kevin Scott, a senior programmer at Phelps Dodge Refining Corp. in El Paso, Texas. "If we're going to buy NT anyway, why spend extra to get Web software from another vendor?"

A ready answer to that question is critical to Netscape if it doesn't want to be shoved into the Unix-only market, said Armen Bedrossian, a consultant at Trend Systems in Glendale, Calif.

Schism exists

Bedrossian said he has seen a clear schism at the entertainment, food and publishing companies where he has helped build internal and external Web sites.

"It's a common sense that if you already use Microsoft operating systems, you use Microsoft Web software. If you use Unix, then Netscape would be the way to go," he explained.

But Netscape doesn't plan to concede the Windows NT market to Microsoft.

Roughly 60% of Netscape's $23.4 million in server sales last year were on NT, and 40% were on Unix, Sampath said.

"We ship suites, not just Web servers, and we ship them for NT and Unix and will continue to do so," he said.

Paper glut

CONTINUED FROM PAGE 1

Many said their companies will spend money on workflow applications for the first time within the next two years. The combined market for workflow products and services is expected to reach $3 billion by early next year, up from $1.25 billion in 1994.

Just how much paper is still around is staggering. Emery said companies that gross more than $1 billion in annual revenue process more than 88 million pages per year.

Even so, companies haven't given up on reducing how much paper they store — or at least on finding better ways to manage it.

Anita Ward, vice president and manager of the re-engineering program at Texas Commerce Bank in Houston, said the bank set out in 1994 to restructure the way it dealt with information. The amount of paper it has on hand is enormous — six miles of trust fund files stand out in Ward's mind.

© Terry Sutton/SIS

The bank runs about 13 imaging and workflow applications, and several more are planned. Paper has been reduced, but more important, access to information is more readily available, Ward said.

Users are also turning to more tailored applications to fit their needs.

Jane Pugh, manager of IT at the Virginia Retirement System, which has more than 300,000 members, said her department used imaging and workflow to change the way it conducted business, eliminating reams of paper in the process.

"We had tremendous amounts of paper coming in and few people to process it," she said. But the IBM imaging system the department installed wouldn't have met its needs without bringing in an IBM business partner to customize it, she said. The project, which began in 1991 and is now fully functional, cost about $3 million.

The AIIM study noted that 44% of the IT professionals surveyed cited ease of use and programming flexibility as predominant factors that influence their workflow purchases.

For Pugh's department, the ability to customize the software enabled employees to create audit trails and case-tickler files to prioritize work.

"You have to understand what your users need because you can automate anything," Pugh said. "But if you can't give them what they need, you haven't accomplished anything."

What users most often look for is easier access to information and quick retrieval time, said Carl Frappaolo, a vice president at Delphi Consulting Group, Inc. in Boston. That can be accomplished most efficiently in an electronically managed environment, he said.

Randall Downs, a consultant for the international document management group at pharmaceutical giant Glaxo Wellcome, Inc. in Research Triangle Park, N.C., said massive amounts of paper there have been reduced with imaging and workflow. But that wasn't the firm's first priority.

Glaxo uses workflow software in its regulatory affairs department to route Food and Drug Administration requests for information on drugs that have been proposed to the scores of employees who must have input into the responses. The company cut its response time from 10 days to two.

Not there yet

But, said Emery, even with advances in the electronic document management market, there is still a long way to go.

"You'll see less paper, but you won't see paperless," she said, pointing out that in spite of E-mail's paperless benefits, people still print out messages. And she says, electronic documents still mimic paper in form, style and content.

"When you go out onto the street and conduct business, a lot of what we get is still on paper, and people trust it. So essentially we are getting more paperless, but we are creating many more information sources and therefore we have to have document management to navigate through that morass," Emery said.

A state agency uses imaging/workflow to save big bucks. See page 76.

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computerworld index

Compiled by Laura Hunt and Mitch Betts

U.S. homes with a **VCR**: 87%

U.S. homes with e **PC**: 36%

Time required to transmit a 1M-byte file (60 to 80 pages of text) with a **28.8K bit/sec. modem**: **5 min.**

With **ISDN**: **1.5 min.**

With a **cable modem**: **Less than e second**

Number of chess moves **IBM's Deep Blue** computer could evaluate in 3 min.: **20 billion**

North American companies that have reduced secretarial staff in the past five years because of cost-cutting and automation: 42%

North American companies that consider themselves understaffed: 54%

Registered **Internet domain names**, May 1996: **325,444**

Average time per week employees spend on the Internet: **8 hours**

Average daily requests to **AltaVista** search engine: **12 million**

U.S. consumers who have heard of **smart cards**: 33%

U.S. consumers who have used **smart cards**: 0.5%

Americans who support computerized lie-detector tests for **job applicants**: 40%

Americans who support computerized lie-detector tests for **political candidates**: 55%

Press mentions of **convergence** since Jan. 1, 1996: **2,382**

Press mentions of **Java** since Jan. 1, 1996: **4,325**

Press mentions of **Bill Gates** since Jan. 1, 1996: **5,096**

Sources: Electronic Industries Association and MCI Communications Corp., both in Washington; *Scientific American*, New York; Dilsten Corp., Melville, N.Y.; *Wired*, San Francisco; Find/SVP, Inc., New York; *Upside*, San Mateo, Calif.; *Card Technology*, New York; Ivy Press, Inc., Dallas

Calling Dick Tracy! *Timex in Middlebury, Conn., has upgraded the Timex Data Link watch, which uses wireless technology to download info-nuggets such as telephone numbers and appointment dates from a PC to the watch. A new version provides more memory and lets the watch download WristApps, such as a 40-word notepad. The watch costs $139 and includes the PC software.*

Digital Frontiers

The World Wide Web offers an effective way for political candidates to reach active voters, according to Jim Pitkow, e researcher at the Georgia Institute of Technology in Atlanta.

More than 90% of the Web users who responded to an online survey said they were registered voters, and 63% said they voted in the most recent elections. Those proportions are higher than those for the U.S. population at large.

Moreover, 31% of the Web surfers said they write to elected officials, and 22% said they had signed petitions. "These numbers suggest that the Web can potentially play a significant role in politics," Pitkow said.

One size fits all

Wanna get a shirt like this?

Inside Lines

HP's poster children

Starved for attentioo from Hewlett-Packard, HP 3000 users will try to unfurl a world-record-size poster during next mooth's HP World '96 conference in Anaheim, Calif. The poster will cover two-thirde or more of a local football field and feature the elegant phrase, "MPE Users Kick Butt." MPE is the HP 3000 operating system. But there are a few issues to contend with, according to a Usenet oewsgroup posting. Even a slight wind has sent test posters flying; a field trial showed it would take four days to assemble the poster rather than the allotted four hours; and everything has to be wrapped up by 4 p.m. oo D-Day because a youth football team neede the field for practice.

Microsoft finds synonyms for 'oops'

Microsoft recently apologized to users of the Spanish-language version of Word 6.0 for dubious diction in the software'e thesaurus. Several offensive options appear when searching for synonyms. These include "savage" and "man-eater" for the word "Indian"; "vicious" and "inverted" for "homosexual"; "pervert" and "depraved person" for "lesbian"; and "Aryan," "white" and "civilized" for "Western." Microsoft hopes to provide a revised versioo for free via the Internet next month.

Cisco boosts ATM viability

Fresh off final approval of its $4 billion merger with StrataCom, Cisco this week will announce products developed by StrataCom aimed at making the leap to wide-area ATM services shorter for users. The technology, called Inverse ATM Multiplexing, aggregates multiple T1 lines so users don't have to move all the way up to T3 lines. Cisco/StrataCom will ship the first product thie week and will add the technology to Cisco routers end switches where appropriate.

IBM brews mainframe 'lite'

In an effort to lure more software vendors to mainframes, IBM later this year will offer software that makes big iron look more like Unix. Called "MVS Polite," the package lets applicatioo makers bring up System/390 functions through a Unix shell so developers "don't need to know about MVS," said Charles Lickel, IBM's vice president of System/390 software development. "We're using this as e first learning experience ... and reducing the amount of skill needed by users" new to mainframes, Lickel said.

DEC to launch FX32

Digital is getting ready to announce its FX32 translatioo software for Alphe chips sometime later this month or early next month. The much-awaited software gives Alpha users transparent access to 32-bit X86 applications, including Windows NT. Accordiog to e Digital source, initially FX32 will allow Alphe chips to run 32-bit X86 applications at greater than 70% of native performance. The product is currently in beta testing with Windows NT 4.0 and will ship concurrently with the operating system.

On July 3, the aliens attack. On July 4, we fight back. On July 11, Independence Day's ***special effects firm credits its network. Pacific Ocean Post, the postproduction firm that handled 200 visual effects shots for the box-office blockbuster*** Independeuce Day ***said its work was made possible with a fiber-channel network from Ancor Communications. The fiber network, which features high-performance switching and lightwave image transmission, replaced Pacific Ocean Post's Ethernet network. It handled the lion's share of the 12.8T bytes of data used for the total 350 special effects in the movie. If you have any special effects you'd like to share, contact news editor Patricia Keefe at (508) 820-8183 or via E-mail at patricia_keefe@cw.com.***

Band-width is tight. ATM sounds nice. But it also sounds pretty darn expen-sive.

Switch IBM presents the first affordable 25Mbps ATM Workgroup Solution. Everyone is talking about ATM as the answer for speeding up busy networks. But there are two good reasons why business hasn't stampeded en masse to the ATM solution: It costs a lot. And to get there, you have to rip out everything you have.

Well, with all respect to the status quo, IBM now unveils the new 25Mbps ATM Workgroup Solution. It comes complete with workstation

adapters, giving you an immediate boost in bandwidth, with plenty of room to grow in the future. And it all comes at the refreshingly low price of $495 per connection.

So why just dream about getting an affordable ATM solution when you can install one today? See your nearest IBM reseller or call us at 1 800 IBM-2468, ext. DA130, to learn more. Or, if you prefer, you can visit our Web site at www.raleigh.ibm.com/netad.html for all of the details. We have lots of information to share. And the good news is, we can get it to you fast.

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